DOCUMENT RESUME

ED 349 247 SO 022 479

AUTHOR Murphey, Carol E.
TITLE What Have You Got To Lose? New World Tropical Rainforests. Grades 3-8.
INSTITUTION Stanford Univ., CA. Stanford Program on International and Cross Cultural Education.
PUB DATE 91
NOTE 136p.
AVAILABLE FROM SPICE--Stanford Program on International and Cross Cultural Education, Littlefield Center, Room 14, 300 Lasuen Street, Stanford University, Stanford, CA 94305-5013 ($39.95, includes slides for the unit).
PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Area Studies; Elementary Education; *Environmental Education; Environmental Influences; Foreign Countries; *Latin Americans; Learning Activities; *Physical Environment; Social Studies; Teaching Guides; *World Affairs
IDENTIFIERS *Latin America; *Tropical Rain Forest

ABSTRACT

In this unit, designed for use with grades three through eight, students explore the biology and peoples of Latin American rainforests and the problems caused by the interactions of people with this environment. The featured activities integrate art, science, language, and social studies. Fourteen lessons, arranged in sequential order, comprise the unit. The first four lessons acquaint the student with how a tropical rainforest feels, looks, and grows. Lessons five to seven provide a brief look at indigenous peoples in New World rainforests. The activities from these lessons are based on the activities of small human groups that inhabit the forests of Central and South America. Problems relating to humans and the delicate rainforest environment are explored in lessons eight to eleven. The intent of lessons 12 and 13 is to review the content material of the unit and consider words, cultural practices, and ideas that reflect a cultural bias. Lesson 14 discusses some solutions to rainforest problems that currently are being attempted. Teacher background information and a rainforest resource list also are included. (DB)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

# WHAT HAVE YOU GOT TO LOSE?

ED 408 472

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

JANE A. BOSTON

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

# NEW WORLD TROPICAL RAINFORESTS

SO 027 479

SPICE

Stanford Program on International and Cross-Cultural Education

BEST COPY AVAILABLE

A Teacher's Guide to a Latin American Environment

STANFORD PROGRAM ON INTERNATIONAL AND CROSS-CULTURAL EDUCATION

# SPICE

Littlefield Center, Room 14, 300 Lasuen Street
Stanford University
Stanford, California 94305-5013
☎ (415) 723-1114

## Background

The Stanford Program on International and Cross-Cultural Education (SPICE) represents a long-term effort by Stanford University to improve international and cross-cultural education in elementary and secondary schools. The program traces its origins to 1973 with the initiation of the Bay Area China Education Project, an effort to upgrade teaching about the People's Republic of China. Subsequently, parallel projects on Japan, Africa, Latin America, Western Europe, and the Soviet Union and Eastern Europe were established, and together with the China Project, became the nucleus of SPICE. SPICE also offers services in the fields of geography and foreign language.

In 1979, SPICE joined with two other international resource organizations–The World Affairs Council of Northern California and Global Educators–to form the Bay Area Global Education Program (BAGEP), an international studies resource consortium serving K-12 schools and districts in the San Francisco area. In 1986, Stanford University, in cooperation with the World Affairs Council and Global Educators, was selected to manage the California International Studies Project (CISP), a legislatively-based (AB 2543) statewide network of international resource centers for which BAGEP serves as a model. SPICE is the curriculum development and materials resource arm of CISP.

## Sponsorship

SPICE is sponsored by the Institute for International Studies and the School of Education at Stanford University.

## Sources of Support

SPICE receives support from federal sources, private foundations, and the Institute for International Studies.

## Current Programs and Priorities

SPICE's current curricular priority is the development of lessons which enhance the study of world history, cultures and geography. In the area of staff development, SPICE's priority is to provide support for the programs of the CISP Resource Centers. SPICE also has ongoing staff development efforts through each of its individual projects, and is centrally involved in a yearly summer institute on the Stanford campus in conjunction with BAGEP.

Within the range of its existing project, SPICE will provide consultation in the development of international studies programs for elementary and secondary education on a fee for service basis.

## Major Emphases

SPICE emphasizes curriculum and staff development and offers a wide variety of teaching materials and staff development programs. SPICE has strong interests in the development of university-based international studies centers, and program evaluation.

## Publication of Teaching Materials

SPICE offers over 60 titles which include curriculum units, resource guides, and research reports. Write to SPICE for a free catalogue.

# WHAT HAVE YOU GOT TO LOSE?

## NEW WORLD TROPICAL RAINFORESTS

**Grades 3-8**

**By Carol E. Murphey**

Developed in conjunction with the Latin America Project,
Stanford Program on International and Cross-Cultural Education (SPICE)

Copyright © by the Leland Stanford Junior University Board of Trustees.
Permission is given to educators to reproduce handouts in this unit
for classroom purposes only. In all other cases, for permission contact:
The Latin America Project/SPICE, Institute for International Studies (IIS), Litttlefield
Center, Room 14, 300 Lasuen Street, Stanford University
Stanford, CA 94305-5013 ☎ (415) 723-1116

# Acknowledgements

The principal author and researcher of this unit, *What Have You Got to Lose?: New World Tropical Rainforests*, was Carol E. Murphey (resource teacher, Whitehead School, Woodland, CA). Production of the unit was inititated under the direction of Dr. Giselle Martin (former Coordinator of the Latin America Project) and Dr. Judith Wooster (former SPICE Director). Dana Walker (Coordinator of the Latin America Project) revised sections of the unit, acting as managing editor. Primary academic advisors for the project were Dr. Joseph S. Leeper (Professor and Chair of the Department of Geography, Humbolt State University), Dr. David B. Sutton (Director of Internships, Program in Human Biology, Stanford University), and Tim Krantz (environmental consultant, biologist). Thanks to Rozanna Fiore and Mark Paramo for research and editing assistance. Mary Dern, Rheinhold Steinbeck, Gary Mukai and Jane Boston also assisted with editing. Eric Jones was the technical and design consultant. The cover was illustrated by Dana Walker, with design assistance from Beth Hansen. The Latin America Project thanks Dorothy Justen and Joanne Taylor for handling the production of the unit.

Special thanks to Dr. Ronald Herring, Director of Public Programs at the Institute for International Studies for his advice on this unit and continuing support. The author also expresses appreciation to Jane Boston, Carol Marquis, Dr. Giselle Martin, Lia Turk Kheirolomoon, Dr. Judith Wooster, Tuckie Yirchott, Dr. Terry Karl and Dr. Kathleen Morrison for their encouragement to produce this unit.

SPICE would like to thank the following educators and their students for field-testing this curriculum unit: Juanita Bates (Olivehurst Elementary, Marysville, CA), Elizabeth Day Marston (John J. Montgomery School, Chula Vista, CA), Betty De Marco (Zamora Elementary, Woodland, CA), Lee Gardner (Whitehead Elementary, Woodland, CA), Paula Joyce (Maxwell Elementary, Woodland, CA), Monica Oakes (Olivehurst Elementary, Marysville, CA), Luz A. Valentin (Beamer Park Elementary, Woodland, CA), and Gil Walker (Gibson Elementary, Woodland, CA).

Many thanks to Tim Krantz for his help with the slide script and the use of his slide (#2). Slides #6 and #7 were taken by Carol E. Murphey. Slides #19, #22 and #23 were generously provided by Paula Lerner/Woodfin Camp. The Basic Foundation donated slide #11, and the Cultural Survival Foundation #14. The Latin America Project is particularly indebted to the Rainforest Action Network (RAN) which, in keeping with its commitment to community support and networking, granted permission to reproduce the remaining slides (#1, #3, #4, #5, #8, #9, #10, #11, #12, #13, #15, #16, #17, #18, #20, #21, and #24), as well as sections of the script which accompanies its slide show (see *Resource Guide for*

*reference).* The map of the world's rainforests was also provided by RAN. The Smithsonian Institution granted permission to reproduce "Cross-section of the Rainforest."

This curriculum unit was developed by Carol E. Murphey and produced at Stanford University by the Latin American Project/SPICE with funding from the Irvine Foundation, the Center for Latin American Studies, Stanford University (HEA Title VI), and the Institute for International Studies.

# Table of Contents

Acknowledgements ..... i

**INTRODUCTION**

Overview of Unit Contents ..... 1
- General Objectives ..... 2
- Suggested Grade Levels ..... 2
- Time ..... 2
- Materials ..... 3
- Adaptation ..... 3
- Guidelines for Working in Groups ..... 3

Teacher Background Information ..... 4
Curriculum Matrix by Lesson Number ..... 6

**LESSON ONE: Understanding a Rainforest**

Lesson Plan ..... 7
Handout no. 1: Map of Rainforests of the World ..... 11
Handout no. 2: Rainforest Square Cards ..... 12
Handout no. 3: Rainforest Labels ..... 14

**LESSON TWO: An Interdependent System**

Lesson Plan ..... 17
Handout no. 1: Plant and Animal Cards ..... 19

**LESSON THREE: Building a Classroom Rainforest**

Lesson Plan ..... 29
Handout no. 1: Suggested Techniques Sheet ..... 32

**LESSON FOUR: The Rainforest Speaks**

Lesson Plan ..... 37

**LESSON FIVE: Rainforest Choices No. 1**

Lesson Plan ..... 39
Group Information Sheet No. 1 ..... 42
Group Information Sheet No. 2 ..... 43
Group Information Sheet No. 3 ..... 44
Group Information Sheet No. 4 ..... 45
Group Information Sheet No. 5 ..... 46
Group Information Sheet No. 6 ..... 47

**LESSON SIX: Stories of the Rainforest**

Lesson Plan ..... 49
Handout no. 1: A Man With a Curious Mind ..... 51
Handout no. 2: How We All Grew From Palm Seeds ..... 53

**LESSON SEVEN: What's for Dinner?**

Lesson Plan ..... 55
Handout no. 1: Family Role Cards ..... 58
Handout no. 2: Survival Cards ..... 62
Handout no. 3: Four Food Groups Explanation and Game Board ..... 65

**LESSON EIGHT: A Greenhouse Out of Control?**

Lesson Plan ..... 67
Handout no. 1: Experiment Directions ..... 70

**LESSON NINE: Good Morning U. S. A.**

Lesson Plan ..... 73
Handout no. 1: Good Morning U.S.A. ..... 75
Handout no. 2: Tropical Key ..... 76

**LESSON TEN: Rainforest Choices No. 2**

Lesson Plan ..... 77
Group Information Sheet No. 1 ..... 80
Group Information Sheet No. 2 ..... 81
Group Information Sheet No. 3 ..... 82
Group Information Sheet No. 4 ..... 83
Group Information Sheet No. 5 ..... 84
Group Information Sheet No. 6 ..... 85

**LESSON ELEVEN: What Have You Got to Lose?**

Lesson Plan ..... 87
Handout no. 1: Interdependence Cards ..... 89
Handout no. 2: Environmental Win Cards ..... 94
Handout no. 3: You Lose Cards ..... 96

**LESSON TWELVE: Will This be the End? A Game of Jeopardy**

Lesson Plan ..... 99
Handout no. 1: Questions ..... 101
Handout no. 2: Answers ..... 102

**LESSON THIRTEEN: "Who Is a Savage? Not I!"**

Lesson Plan ..... 103
Statement Sheet No. 1 ..... 105
Statement Sheet No. 2 ..... 106
Statement Sheet No. 3 ..... 107
Statement Sheet No. 4 ..... 108
Statement Sheet No. 5 ..... 109

**LESSON FOURTEEN: What Will Happen If I Never Eat Another Hamburger?**

Lesson Plan ..... 111
Handout no. 1: Save the Rainforest Cards ..... 114

**RAINFOREST SLIDE SCRIPT** ..... 119
Handout no. 1: Seven Group Tasks ..... 123

**RAINFOREST RESOURCE LIST** ..... 125

# INTRODUCTION

Tropical Rainforests are far away and something our students may never experience, so why should we teach children about them? This is best answered with a quote by Baba Dioum: *"In the end we will conserve only what we love. We will love only what we understand. We will understand only what we are taught."* The depletion of rainforests the world over will have drastic implications for the lives of today's children. These same individuals will become responsible for the future of the remaining rainforests.

Tropical rainforests are found in both the New and the Old Worlds. This set of lessons deals only with plants, animals and people of the New World rainforests. In this unit students will explore the biology and people of the rainforest and some problems caused by the interaction of people with this environment. The students will be involved in activities that are interactive and thought provoking. Group cooperation is a common theme throughout the lessons. Like the plants and animals of the rainforest, the students are dependent on each other to complete their tasks. Emphasis has been placed on integrating art, science, language and social studies under the umbrella of "the rainforest".

## OVERVIEW OF UNIT CONTENTS

The lessons have been arranged in sequential order. The first four lessons acquaint the student with how a tropical rainforest feels, looks and grows. Lessons Five, Six and Seven provide a brief look at indigenous peoples in New World rainforests. The activities from these lessons are based on the activities of small human groups that inhabit the forests of Central and South America. Problems relating to humans and the delicate rainforest environment are explored in lessons Eight, Nine, Ten and Eleven. The intent of lessons Twelve and Thirteen is to review the content material of the unit and consider words, cultural practices and ideas that reflect a cultural bias. Lesson Fourteen discusses some solutions to rainforest problems that are being attempted currently. Slides, a slide script and a list of rainforest resources complete the unit.

© SPICE

## GENERAL OBJECTIVES

The major objectives of this unit are:

### KNOWLEDGE

- to introduce the biology and the geography of the rainforest
- to develop an understanding of the rainforest and its habitat
- to introduce the student's role in effecting the problems and solutions of rainforests

### ATTITUDE

- to underscore both the relationship of the student to distant rainforests and the responsibility for individual action that is inherent in that relationship
- to believe that solutions are possible
- to develop the recognition of the interrelationship between humankind and the environment

### SKILLS

- to promote critical thinking on the part of the students about a complex problem that impacts their present as well as future lives
- to imitate the need for world-wide cooperative efforts toward solving rainforest problems through working cooperatively in groups
- to integrate reading, writing, art and social science around a science theme which allows the student to learn in a meaningful and less fragmented way
- to allow students who are classified as "gifted" as well as students who have learning disabilities or language problems to function, learn and produce in an interactive group situation that supports learning for everyone

## SUGGESTED GRADE LEVELS: Grades 3 - 8

## TIME

The length of time required to do the entire unit will vary according to the age group performing the tasks and the daily time alotted to the unit by the teacher. An hour a day at the elementary level would require a minimum of three weeks and a maximum of six weeks to complete the unit.



© SPICE

## MATERIALS

Basic classroom supplies are needed to implement this unit. All other materials are enclosed. Optional enhancement materials are suggested in the resource list.

## ADAPTATION

The teacher is encouraged to adapt the lessons to meet the needs of the students using them. Optional follow-up activities, which may be used to extend learning, are suggested after each lesson. A Spanish translation of the poster, *"Cross-Section of a Rainforest,"* is available from SPICE to assist teachers in adapting this unit for bilingual instruction.

## GUIDELINES FOR WORKING IN GROUPS

*All students need to be prepared to work in groups to insure that learning will be effective.* Groups need to be held accountable for the work assigned them and for their behavior. Everyone in the group must be assigned a role. These roles will change as the tasks change. Emphasis must be placed on the importance of the completion of a job well done. The skills of listening, encouraging the participation of others, having a positive attitude, formulating good questions, being responsible for one's task, respecting the ideas of others and working for the good of the whole group should all be discussed before the lesson and monitored by the teacher during the lesson.

*The teacher must be a facilitator rather than a director of learning.* Students must feel free to contend with problems and to seek and apply their solutions. The teacher's role then is to identify the issues through a questioning process, give feedback on group procedure and assist with conflict management. While the teacher might suggest other viewpoints to a working group, he or she must be careful not to usurp the authority of the group or to give the groups solutions to their problems. It is the teacher's role to assure group heterogeneity, positive group interdependence, individual accountability and the development of leadership skills by allowing the students to play various roles in a group setting and by monitoring and processing the group's interactions.



© SPICE

## TEACHER BACKGROUND INFORMATION

To understand the consequences of the loss of even a small part of tropical forests, the student must first be well acquainted with the interdependent structure of the rainforest itself. A rainforest exists in a series of layers. The top layer is the emergent layer, where only the tallest trees are found. These are the few giants of the area. This is the home of small animals, the fliers and gliders. Next are the myriad of plants and animals that live in the canopy. Most species of plants and animals live here. Below this is the understory, composed of short trees and shrubs. The animals living here tend to be well camouflaged. Finally, we reach the forest floor, where the air is incredibly humid and very still. Only a fraction of the light from above penetrates this area.

The rainforests are the home of a dynamic symbiotic system where plants grow on plants, and animals and plants develop cooperative relationships to survive in a very competitive environment. The average temperature of a tropical rainforest is 75 degrees Fahrenheit and 60 inches or more of rain fall annually. In some areas 10 or more feet of rain can fall. The rains in the Amazon region cause an annual flood that raises the level of the river to the canopy of the forest. Under these conditions the main activity of plants and animals is survival. Only two percent of the earth is covered by rainforests, but more than half of all the plants and animals in the world live there. Although there is a great variety of species, the numbers of individuals within those groups is few. Extinction can occur easily if localized species are wiped out.

Why do we need this two percent of our world, and why preserve the strange plants and animals that live here? One reason is that tropical rainforests have been described as the "lungs of the world". The leaves on this mass of plants give off oxygen and absorb carbon dioxide from the atmosphere. Under normal circumstances much of the carbon dioxide released into the atmosphere by natural sources and life processes would be retrieved by green plants. The remaining carbon dioxide and other gases form a shield over the earth that prevents some reflected sunlight from escaping into outer space. This greenhouse effect warms the earth and allows it to be inhabitable. After more than one hundred years of burning fossil fuels, using fluorocarbons and releasing methane from landfills, farmland and swamps, carbon dioxide has accumulated in the atmosphere. At the same time there is an unprecedented destruction of the rainforest that normally absorbs most of the carbon dioxide. Scientists theorize that this build up of carbon dioxide and other gases could cause a global warming of two to five degrees Fahrenheit within a few decades. The results of this warming could cause world-wide climate changes. Regions that are now wet could become arid, while polar latitudes would become warmer. Sea levels could rise due to the release of water stored as ice in the polar regions. Current farming patterns could be disrupted. This chain of events would be the result an accelerated greenhouse effect.


© SPICE

Removing the rainforest through cutting and burning has an additional effect on the climate of an area. The mantle of the rainforest is a flood control device that absorbs the water and recycles it back into the atmosphere. When large sections of a forest are removed, this cycle is interrupted resulting in floods that silt up rivers, the destruction of top soil and the washing away of river banks. If the forest is cleared, the cycling of water ceases and aridity results.

Tropical rainforest plants are also the source of many pharmaceutical compounds. Seventy percent of the plants known to produce compounds with anti-carcinogenic properties are found in tropical regions. Many other common medicines come from rainforest plants. Aspirin, steroids, heart medicine, muscle relaxants and painkillers are a few examples of pharmaceuticals extracted from tropical plants. Genetic materials from other plants are used by chemists to improve important crops. Very few of the many potentially useful species have been studied and it is very possible that many more discoveries useful to humans may be found. Deforestation results in the extinction of many species of plants and animals.

Never before have we had to consider the devastating human impact on the rainforests as we are today. Indigenous peoples of the forest lived in harmony with their environment before the discovery of the Americas by the Spaniards and Portuguese. Although these groups practiced slash-and-burn farming, their numbers were small and the tracts of land burned were minor. Many groups practiced planting and burning methods that encouraged the regrowth of the original forest on the land they abandoned. They took only from the forest that which they needed to survive and their impact was small. These groups were restricted to the tools they could make by hand. Travel from place to place took time and energy and restricted the amount of contact they had with each other. The appearance of Europeans changed this way of life and inevitably began the destruction of the forest. Modern tools and machines have quickened the destruction of both the forest habitats and the indigenous people themselves.

© SPICE

## CURRICULUM MATRIX BY LESSON NUMBER

| Lang. Arts | Soc. Science | Math | Science | Art | Critical Thinking | Study Skills | Evaluation |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | | 1 | | |
| | | | 2 | | 2 | | |
| | | 3 | | 3 | | | |
| 4 | 4 | | | | 4 | | |
| 5 | 5 | | 5 | | 5 | | |
| 6 | 6 | | | | 6 | | |
| 7 | 7 | | 7 | | 7 | | |
| | | 8 | 8 | | 8 | | |
| 9 | | 9 | 9 | | 9 | | |
| 10 | 10 | | | | 10 | | |
| | 11 | | 11 | | 11 | | 11 |
| 12 | 12 | 12 | 12 | | 12 | 12 | 12 |
| 13 | 13 | | | | 13 | | 13 |
| 14 | 14 | | | | 14 | | 14 |

© SPICE

LESSON ONE

# UNDERSTANDING A RAINFOREST

"Epithet after epithet was found too weak to convey to those who have not visited the intertropical regions, the sensation of delight which the mind experiences .... The land is one great wild, untidy luxuriant hothouse, made by nature for herself..."

*Charles Darwin*

## OBJECTIVES

- to gain a working knowledge of the interdependent nature of a rainforest
- to understand the layers of a rainforest
- to locate New World rainforests on maps
- to use critical thinking skills
- to have an opportunity to work cooperatively in a group

**GRADE LEVEL:** Grades 3 - 8

**TIME:** Two to three class periods

## MATERIALS

- ❑ *Map of New World Rainforests* (p. 11)
- ❑ *Rainforest Slides* (or other picture source material) and *Rainforest Slide Script* (p. 117)
- ❑ *Rainforest Square Cards* (p. 12)
- ❑ *Rainforest Labels* (p. 14)
- *Cross-Section of a Rainforest* poster (available from SPICE)*
- *Sounds of the Jungle* and *Tropical Rainforest* audio tape (see *Resource List*)*
- *Rain Forest*, National Geographic video (see *Resource List*)*
- small student chair
- masking tape to mark the rainforest area
- yard stick or measuring tape to measure square

*optional

## PROCEDURE

### Getting to know the rainforest

1. Discuss with the students why tropical rainforests are going to be studied. Use the introduction provided or select material from the *Resource List*.

2. **Sounds of the jungle.** Play the tape *Sounds of the Jungle and Tropical Rainforest*. As the tape plays, have the students write down what they think they know about this kind of place. If you do not have the tape, simply have them write what they know about a tropical rainforest. What does it feel like to be in a rainforest? What products come from these forests? Where are these forests located? Why are they endangered? What benefits will the world reap from their preservation? Ask them to put down the source of these impressions (TV, magazines, etc.).

3. **Introduction to the geography of the world's rainforests.** Locate the New World rainforests on the world map. Explain the term "New World" if necessary. Ask what they have geographically in common (e.g., they all lie on or near the equator). What does this location have to do with their climate? What New World countries have tropical rainforests?

4. **Poster display.** Explain to the students that they will be viewing a slide show that illustrates the interdependent systems of the rainforest. Display the optional poster *Cross-Section of a Rainforest* (in Spanish or English, or both) as you explain this.

5. **Group task sheets and slide show.** Have students form six groups of five students each. Hand out *Seven Group Tasks* to each group, and tell them to read together the questions before the slide show begins. Show the rainforest slides from the back of this book. Use the *Slide Script* to explain them to the class. Study prints that illustrate the concepts of layered environment or interdependent systems. Debrief the slide show, using the questions provided in the *Seven Group Tasks*. If you have the poster, use it to point out the different layers of the rainforest.

6. If you have access to the National Geographic video *Rain Forest*, show it now. Have a debriefing session after the showing. If you do not have the video, proceed to step 7.

### Building a human rainforest

7. **Building a rainforest square.** Measure a square space in your classroom 6 feet by 6 feet. Mark it with tape. Place 1 small student chair or an overturned wastepaper basket in the center of the square. The square


© SPICE

represents the rainforest. Cut apart and distribute to the students their individual *Rainforest Square Cards* (found on p. 12) for participation in the rainforest. Have the students assemble themselves in the square according to the instructions on the cards. Children beyond the number thirty should be given Canopy positions, less than thirty should be removed from the Canopy or mid-zone. The Canopy should always be the largest group. If your class is small, you might consider reducing the size of the square.

8. **Rainforest labels.** Give the students that stand above the others the label "Emergent Layer" (all labels are found on p. 14). The students in the level just below this are handed the label "Canopy." The next layer is labeled "Understory." The last layer is given the label "Forest Floor."

8. Debrief this exercise by discussing how it felt to be in this rainforest. Draw out the idea that cooperation is needed to be successful. Ask the students if they have any new perceptions of a rainforest.

9. **Charting rainforest "feelings."** Divide the class according to where students were in the rainforest (i.e., Emergent Layer, Canopy, Understory or Forest Floor). Each group chooses a reporter, recorder, encourager and timer. They have 15 minutes to discuss how it felt to be the part of the forest they were. Did their group have enough air and light? Why? Why not? Did that effect their feelings? The group should produce a chart that shows how each person in the group felt (i.e., happy, sad, annoyed, etc.).

10. Have the students save their rainforest labels. The labels will determine their task in Lesson 2. Proceed to Lesson 2.

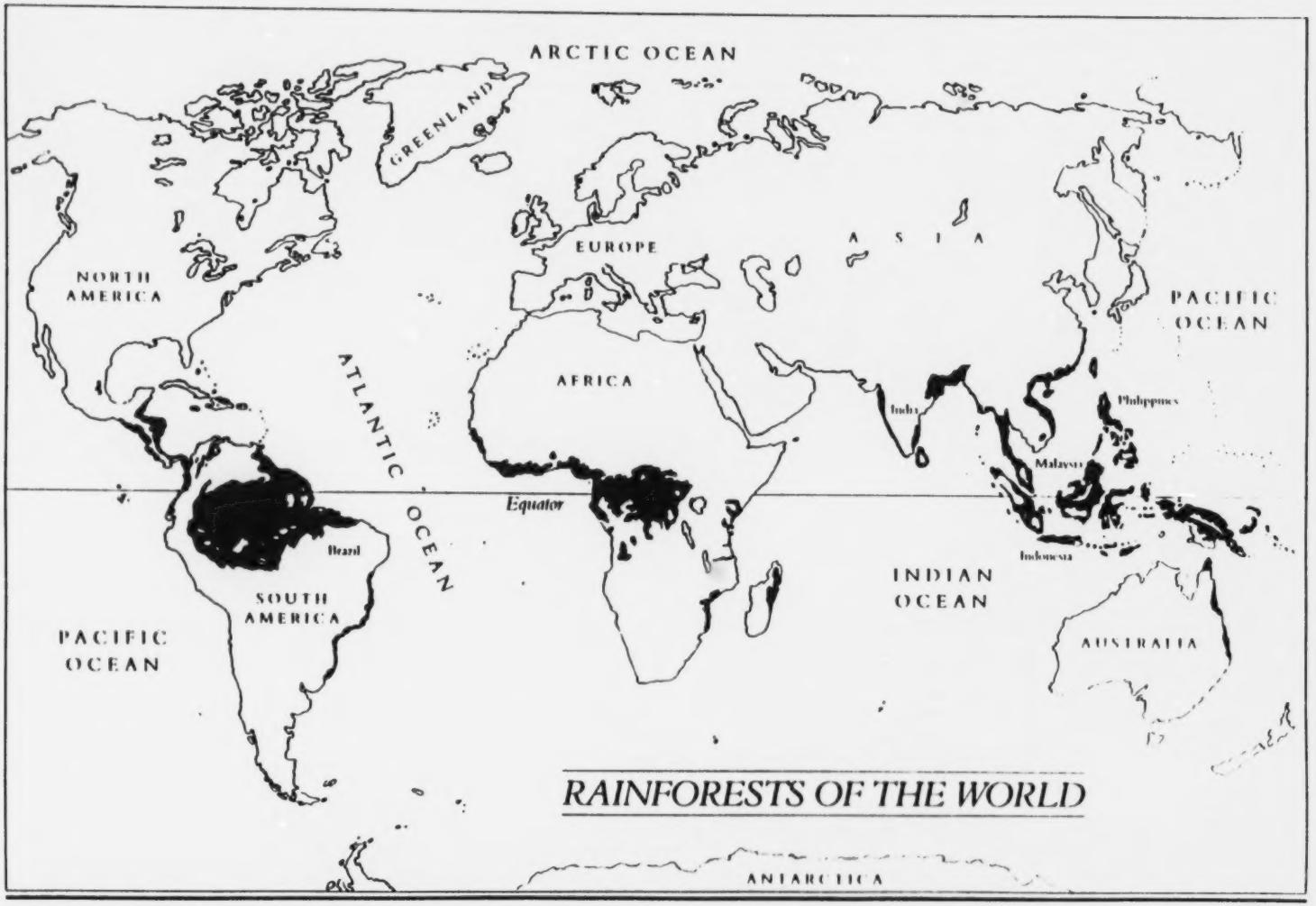
## SUGGESTED FOLLOW-UP ACTIVITIES

☞ Take a photograph of the human rainforest. Use the photo as a stimulus for a creative writing project.

☞ Start a rainforest journal. Have each child keep one in the manner of a scientist's field journal. Have them record each event they do or study.

☞ Measure the students in the position they were directed to assume. Who were the highest and lowest people? What was the average height of the people in the middle? Discuss what was the best position to be in. Why?

© SPICE




© 1990 Rainforest Action Network

Map of tropical rainforests reprinted with permission by SPICE, 1991.
Please note that a significant tropical rainforest exists on the Big Island of Hawaii, although not depicted on the map.

# RAINFOREST SQUARE CARDS

Please cut along the dotted lines and paste onto index cards of appropriate size.

E = Emergent Layer C = Canopy U = Understory F = Forest Floor

| | |
|---|---|
| sit on a chair C | sit on a chair C |
| sit on a chair C | sit on a chair C |
| sit on a person with your arms up C | sit on a person with your arms up C |
| sit on a person with your arms up C | sit on a person with your arms up C |
| stand with arms up (the 4 tallest students) E | stand with arms up (the 4 tallest students) E |
| stand with arms up (the 4 tallest students) E | stand with arms up (the 4 tallest students) E |
| stand with your arms around someone C | stand with your arms around someone C |
| stand with your arms around someone C | stand with your arms around someone C |



© SPICE

| | |
|---|---|
| **kneel U** | **kneel U** |
| **kneel U** | **kneel U** |
| **sit on floor, legs crossed F** | **sit on floor, legs crossed F** |
| **sit on floor, legs crossed F** | **sit on floor, legs crossed F** |
| | |
| | |
| | |
| | |
| | |

© SPICE

# RAINFOREST LABELS

| | |
|---|---|
| FOREST FLOOR | |
| FOREST FLOOR | |
| CANOPY | CANOPY |
| CANOPY | CANOPY |
| CANOPY | CANOPY |
| CANOPY | CANOPY |
| CANOPY | CANOPY |
| CANOPY | CANOPY |
| CANOPY | CANOPY |
| CANOPY | CANOPY |
| CANOPY | CANOPY |



© SPICE

| CANOPY | CANOPY |
|---|---|
| EMERGENT LAYER | |
| EMERGENT LAYER | |
| EMERGENT LAYER | |
| EMERGENT LAYER | |
| UNDERSTORY | |
| UNDERSTORY | |
| UNDERSTORY | |
| UNDERSTORY | |
| | |
| | |
| | |

© SPICE

LESSON TWO

# AN INTERDEPENDENT SYSTEM

"When we try to pick out anything by itself we find it hitched to everything else in the universe." *John Muir*

## OBJECTIVES

- to understand how plants and animals in a rainforest are dependent on each other for survival
- to work cooperatively in a group
- to follow written directions
- to practice classification skills
- to use the concepts taught in the previous lesson

**GRADE LEVEL:** Grades 3 - 8

**TIME:** One or two class periods

## MATERIALS

- ❑ handout of *Plant and Animal Cards* (p. 19) (cut and pasted onto 3" X 5" cards)
- pictures of rainforest plants and animal

## PROCEDURE

1. Distribute the Canopy *Plant and Animal* cards to the children that were the Canopy in Lesson One. Do the same for the Understory, Forest Floor and Emergent Layer children.

2. Each child reads his or her card and finds a person(s) whose card is related to theirs. The students then thread the cards together with yarn. For example: nectar feeding bats could be tied to flowers. More than two students can be connected. After the connected groups are formed, the group assigns the role of artist, reporter, researcher and encourager. Each person is still responsible for knowing his or her place in the layers of the rainforest.

3. The partners then draw and cut out their animals or plants. The drawings should be as close to life-size as possible. Picture books from the school library or some of the material in the *Resource List* might be helpful here.

4. When everyone has found a match and drawn his/her plant or animal, have the kapok tree and the matapalo mount their cut-out on the bulletin board or wall. Label this the emergent layer. Have the students share their information. Any other emergent layer items should be pinned up now. Items should be tied together if they are related.

5. The canopy people then come and join their pieces to the matapalo or the kapok tree. Continue the information sharing.

6. Next the understory and forest floor pieces are added and shared.

7. After all the pieces are in place, student groups debrief the activity by answering questions such as:

   - What have we learned about rainforests from this activity?
   - What surprised you about this rainforest environment?
   - Is the matapalo (strangler fig) a good or bad addition to the rainforest? Defend your answer.
   - Where do most of the plants and animals live in a rainforest? Why?
   - Is the rainforest a gentle or violent place? Why is it this way? Does its character enhance survival of that which lives there?
   - Would you like to live in a rainforest? Why? Why not?

   The students have 10 minutes for this debriefing.
   The group then shares these perceptions with the class.

8. Have the students write in their journal about their impressions of a rainforest.

## SUGGESTED FOLLOW-UP ACTIVITIES

☞ Have the students research and report on their individual piece of the rainforest.

☞ Have the students paint a vertical section of the rainforest.





© SPICE

© SPICE

# PLANT AND ANIMAL CARDS

**EMERGENT LAYER**

You are an old **kapok tree.** You are very tall and stand above the other trees around you. Parrots, macaws and insects fly up from the canopy to sit on your broad branches. Sloths sometimes climb up to sun themselves. Wrapped around your thick trunk is a matapalo (strangler fig). It is eating your food and slowly squeezing you to death. A heavy load of tank bromeliads hang on your branches.

**EMERGENT LAYER**

You are a **matapalo** (strangler fig). Your name means tree killer. You have aerial roots growing down to the ground. You are all wrapped around the kapok tree. Your trunk is very thick and slowly squeezes the kapok tree to death. All the twists and turns are full of little plants and animals. Your leaves are aggressive sun seekers and are up in the emergent layer competing with the kapok leaves for sunshine. Once you have developed enough to "strangle" your tree, you become a free standing tree.

**EMERGENT LAYER**

You are a **tiny green parakeet.** You and your flock are feeding on the tiny seeds of the kapok tree. It is your favorite food. As a breeze comes up, some of the kapok seeds also fly off with the silken kapok threads.

**CANOPY**

You are a **green Amazon parrot.** You and your whole flock are stuffing yourselves with ripe figs. You never fly down to the forest floor.

**CANOPY**

You are an ***ojo de agua*** (paper wasp). Your name means "crying eye" and you sting very hard. You are about two inches long and live in a lizard-size hole in the matapalo in the understory.

© SPICE

**CANOPY**

You are a **whip scorpion.** You live in a hollow part of the kapok tree and come out in the evening to roam up and down the matapalo trunk looking for roaches and crickets to eat. Your trail has a very poisonous sting. You range back and forth from the understory to the canopy.

**CANOPY**

You are a **nectar-eating bat.** You come out at night and feed on the pollen from the blooming kapok tree and other blooming trees in the canopy and the understory. As you fly from flower to flower pollen sticks to your body and falls off into other flowers to pollinate them.

**CANOPY**

You are a **tank bromeliad**. You catch large amounts of water in your cupped long slender leaves. A poison arrow frog (dendrobate) has crawled up from the forest floor and laid her eggs in your tank. You are an epiphyte, which means you are a plant that is supported by another plant. You can store water and prevent yourself from drying out by closing your cells when it is dry. You live in the canopy on a kapok limb. Matapalo seeds often fall near you and use your decayed matter help them grow. Birds and bats pollinate you.

**CANOPY**

You are a **gecko**. You have a blue-black body and a rust-orange head. You spend your day fighting for territory with other geckos. You live on the matapalo trunk and hide in some of its many holes when a predator like a bird turns up. They are particularly fond of eating you.

**CANOPY**

You are a **poison arrow frog** (dendrobate). You are a very good parent. When it is time to lay eggs you crawl up into the canopy and lay your eggs in a tank bromeliad. This way the eggs have lots of moisture and fish can not eat them. Under your skin is a very toxic poison that kills predators when they bite you. The local indigenous people catch you and tip their arrows in a solution of poison made from your skin.

**CANOPY**

You are one of a 600,000 ant swarm of **army ants**. You are crawling along the forest floor, eating and tearing apart everything in your path. You are eating cockroaches, scorpions, millipedes, katydids, wasps, beetles, termites and other ants. You form a column and march up into the canopy. When your group is moving, nothing is safe. You navigate by smell. The people of the forest use your powerful jaws as sutures for bad cuts, instead of sewing up the wound.

© SPICE

**CANOPY**

You are one of a group of **howler monkeys**. You are greeting the rising sun with a loud ruckus typical of your group. You feed on fruits in the canopy and only come to the forest floor to rescue young who fall out of the tree. As you crash back and forth, many of the fruits from the tree you are in fall to the forest floor.

**CANOPY**

Your are a **sloth**. It is hard to see you. You move so slowly, green algae grows in your hair and you blend in with the trees. Moths lay eggs in this algae and the hatching larvae eat it. You eat the leaves of the tree you hang in. When they are gone, you slowly move to another spot. Once a week you descend from the canopy to defecate. You carefully bury your waste products at the base of the tree and climb back up. Are you nourishing the tree?

© SPICE

**CANOPY**

You are an **orchid plant**. You live in the canopy on a limb of the kapok tree. Like the bromeliad you are an epiphyite and store water. You are a very special orchid. You grow in an ant's nest. As you grow, the ants use your roots to enlarge their nest. You get some food from them. They eat insects that would otherwise eat you.

34

**CANOPY**

You are an **eyelash viper**. You are a beautiful emerald green snake and look just like your home of green moss. You are way up in the canopy in a part of the kapok tree that has rotted away and is hollow. You eat insects, lizards and frogs.

35

© SPICE

**CANOPY**

You are a **bird-eating spider.** You live high up in the canopy and eat birds and snakes. You jump on your prey and suck the fluid out of them.

**CANOPY**

You are a **passion flower vine.** Heliconid butterflies lay their eggs on your leaves. When the larvae hatch out they eat your leaves. Other insects cannot do this because your leaves are poisonous. Sometimes you develop a new poison and kill the butterfly caterpillars, but they always begin to develop an immunity to your poison.

**CANOPY**

Your are a **heliconid butterfly.** You can eat the poisonous leaves of the passion flower. Birds cannot eat your caterpillars because the poison stays in their bodies. You warn that you are poisonous by wearing bright colors that tell predators you are dangerous to eat. You fly around in the canopy and understory.

**CANOPY**

Your are a **hummingbird.** You have to eat every ten to fifteen minutes. You fly around the tallest trees in the canopy and emergent layer. You help pollinate these trees by transferring the pollen that has brushed on to you to other flowers.

**CANOPY**

You are a **capuchin monkey.** You leap easily from branch to branch in the canopy. You are eating figs from the matapalo and many are falling to the forest floor. Some fall into tank bromeliads.

**CANOPY**

Your are a **toucan.** You fly in the canopy and come to the ground in open places in the forest. You use your big beak to help crack the hard seeds and fruits you eat.

© SPICE

**UNDERSTORY**

You are a **jaguar.** Your spots help keep you camouflaged as you lie in wait for small animals to eat. Your favorite place is a low tree limb, where you pretend to be the leaf pattern. You have no predator but humans.

38

**UNDERSTORY**

You are a **philodendron.** You twine around anything to get to the light. Your leaves are small lower down, but larger at the top where there is light. You can even grow on the matapalo. Insects and birds rest on you and eat parts of you.

39

© SPICE

**UNDERSTORY**

You are a **cacao tree.** Your flowers grow straight out of your trunk and hang down. You make a large, hard fruit, the seed of which gives us chocolate. You are pollinated by nectar-eating bats. The people that live in the forest eat your fruit and sell your seed to be ground up as raw chocolate. Unless you are planted on a tropical farm you do not grow near other cacaos.

**UNDERSTORY**

You are an **emerald tree boa.** You live on branches. You are camouflaged, blend in with the foliage and strike out at rodents.

**UNDERSTORY**

You are a ***palo santos*** tree. Your name means "holy stick." Nothing will grow within a two-foot ring of you. Nothing can touch your bark without receiving a paralyzing sting. You have worked out a partnership with some ants. You produce a nectar in your hollow trunk that they feed on and they in turn sting everything that gets near.

**UNDERSTORY**

You are a **leaf mimic mantid.** You look just like a leaf and move like a leaf. Your predators have a very difficult time seeing you. You can be found anywhere there are leaves.

**UNDERSTORY**

You are a **mosquito**. You carry the encephalitis virus which leads to inflammation of the brain. You got this virus from biting a bird who had it. You will give it to the first human you bite.

**UNDERSTORY**

You are a **hooded warbler bird**. You migrate in the winter to the tropical rainforest and follow swarms of army ants to get your dinner.

© SPICE

**FOREST FLOOR**

Your are **lowly fungi**. You help the whole tropical rainforest survive. You break down all the matter that falls to the forest floor and return phosphorus and potassium to the forest plants that they need to grow. You are so efficient at this that you return twenty times the amount of these chemicals to the plants that they lose to the rains. If the forest is removed, you die for lack of things to digest. When you die, none of the plants that depend on you can grow back. Without plants the animals die. You are truly the most important element in the interdependent system called a rainforest.

42

**FOREST FLOOR**

Your are a **peccary** (wild pig). You dig up roots to eat. You also like to be near troops of monkey so you can gorge yourself on the fruit they knock down from the canopy.

© SPICE

**FOREST FLOOR**

You are a **look-alike beetle.** You live on the back of an ant and even look like one. You calm them by grooming them. When you are hungry, you eat the ant larvae.

**FOREST FLOOR**

Your are a **walking stick.** You can be very large. You hide in the leaf debris on the forest floor and look like a stick. You are related to leaf mimics.

LESSON THREE

# BUILDING A CLASSROOM RAINFOREST

"Some of the most beautiful eyes in the tropics never see. Painted on the hind wings of many moths in rich detail are false eye spots - deep blue spheres countershaded with ebony and highlighted with many silver flecks."

*Adrian Forsyth and Ken Miyata*
Tropical Nature

## OBJECTIVES

- to work cooperatively in a group
- to practice classification skills
- to use the information from the previous lesson
- to have a creative art experience that deals with shape, size and texture

**GRADE LEVEL:** Grades 3 - 8

**TIME:** One class period or more

## MATERIALS

- yarn, cloth scraps of various textures, colors and sizes
- *Plant and Animal Cards* (p. 19)
- hole punch, push pins
- scissors, glue, staples and stapler
- butcher paper, paint, felt tip pens and crayons
- blank bulletin board or wall
- assorted plant and animal books from the school library or this unit's *Resource List*

❑ *Suggested Techniques Sheet* for each group.

## PROCEDURE

1. Divide the class into 6 groups of 5. Each group should be working on a different task. Give the groups the following directions and share pictures. Roles for this activity might include: cutter, drawer, painter, gluer, stuffer and placer.

2. Each group should have a copy of the *Suggested Techniques Sheet*. With younger students the teacher may wish to illustrate the step by step techniques.

## GROUP ACTIVITIES

**Group 1**
Discuss the various sizes, shapes and colors of the leaves in the rainforest. Have the children choose paper and materials and cut out leaves that are life-size. Show them how to fold a fan, how to cut more than one item at a time and how to curl paper by placing it between your thumb and the flat edge of a scissor. Easter basket grass and scraps of velvet are useful here. Tree trunks take on a third dimension when made of crumpled columns of butcher paper.

**Group 2**
Discuss the shapes, sizes and length of aerial roots and vines in the forest. Show them the paper curling and cutting techniques mentioned above. Have them make tree trunks with thorns. Have them choose yarn and paper to produce their product.

**Group 3**
Refer to books for pictures of the insects, frogs, snakes and lizards common to the rainforest. Show them how to make paper stuffed specimens and how to cut spirals. Encourage them to use brilliant colors. You might also find books on *origami* folding to share with this group.

**Group 4**
Look at pictures of the mammals of the rainforest. Encourage them to make life-size models. Some could be stuffed with paper, some could be flat and painted. These children will need lots of butcher paper.

**Group 5**
Look at pictures of bromeliads. If possible bring in a house plant sample. Look at orchids and other flowers of the rainforest. Look at mushrooms. Encourage them to use brilliant colors.

**Group 6**
Look at pictures of birds of the rainforest. Discuss coloring and size. Suggest paper stuffing some of the larger ones. Give them paper and cloth to make their models. If you have access to feathers they would be useful, but not necessary here.


© SPICE

## ASSEMBLY

- Have the groups decide how each piece they made fits into the forest floor, canopy, emergent layer or understory. Then have them pin or staple their pieces to the rainforest wall they created in Lesson Two. Daily addition to the forest can simulate growth.

- Debrief by discussing how the room looks. How does the classroom make you feel now that all the plants and animals are up? Write in your journal about your favorite part of this rainforest, how it makes you feel and how you would feel if it were gone.

## SUGGESTED FOLLOW-UP ACTIVITIES

☞ The teacher can have the forest grow secretly at night. Have the vines extend across desks and doorways.

☞ Have the students write poetry about the feelings their rainforest gives them. Discuss, colors, textures and shapes in their rainforest, as well as space, light and air.

© SPICE

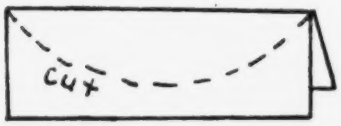
# SUGGESTED TECHNIQUES SHEET

**LEAF SHAPES:**

Leaves come in many sizes and shapes and can be very light green to almost black. They can also be purple, pink and yellow and have spots or stripes.

**Long and pointed:** ( 1 inch to 12 inches )

- Fold a rectangular paper in half and cut double, curving the shape at the top and bottom, as shown.




- Serrated edges may be made with pinking shears.

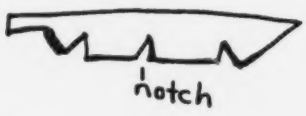
- Bromeliad plants may be made by cutting several pieces as above, in a long sword-like shape. After cutting, gather these pieces into a circular bunch and staple together on the bottom.

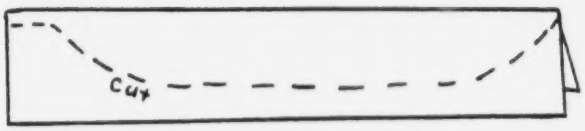
**Fan shaped:** ( 12 inches to five feet )

- Fold a rectangle in a fan shape. Fasten the fan at the bottom with a staple as shown.

**Banana Leaf - Heliconia shape:** ( 2 to 4 foot pieces of butcher paper )

- Fold your piece of paper in half. Cut double, making a curved cut at the top and bottom as shown. Notch the edges in 2 or 3 places.



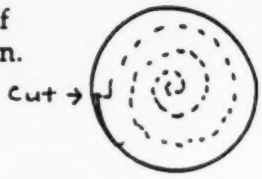



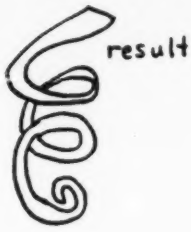



© SPICE

**VINES:**

- Take a large circle or square sheet of paper and cut in the manner shown.
- Glue appropriate leaves or flowers on your vine.




**FLOWERS:**

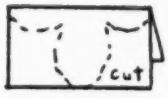
**Tubular flowers:**

- Cut a long rectangle. Form a cylinder and glue the sides together. You may cut the top with pinking shears or little short cuts if you wish.

1.

- Use a square or circular piece of paper to form the base petals. Fold the paper in half. Trace the number of petals you wish on one side. Cut double, following the lines you have drawn.

2.




- Place pieces of tape on the inside of your cylinder, with some tape edge extending from the bottom.
- Tape your cylinder to the petal base.

3.

4.

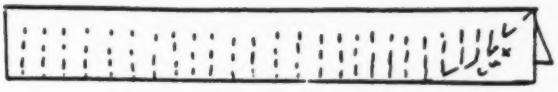
**Four and six petal flowers:**

- Fold a square or rectangular piece of paper in half. Trace the petal design on one side. Cut double, following the lines. Fold petals up or down, or pinch together at the base and staple.

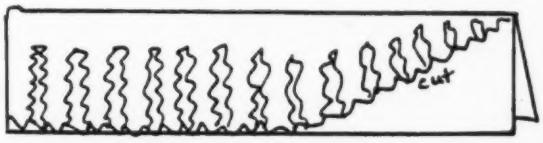
© SPICE

**Feather Palm and Fern Shapes:** ( 12 inches to 10 feet or more pieces of butcher paper)

- Fold a long rectangle in half. Cut double and curve at the top as shown. Cut straight towards the center fold at approximately 1 inch intervals.

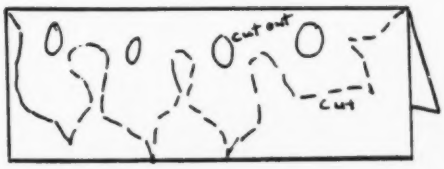


- For a fern cut the straight lines with pinking shears and remove every other space.




**Deeply lobed leaves such as Philodendron and Papaya:** ( 12 inches to 3 feet )

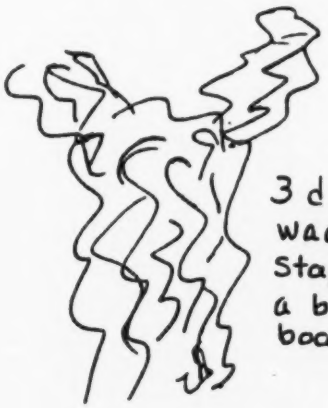
- Study a picture of this kind of leaf. Fold your paper in half and trace the desired shape on one side, then cut double, following the lines you have drawn.




**BRANCHES, STEMS, AND TREE TRUNKS:**

**Tree trunks:**

- Wad up long strips of butcher paper, as shown.



3 dimensional wadded paper stapled to a bulletin board.

**Branches and stems:**

- Fold long rectangles and tape shut, or cut long rectangles and fold down the center for strength.
- Pipe cleaners can also be used.

© SPICE

**Pendular flowers, such as Heliconias:**

- Fold a long rectangle in half. Trace the shape shown below on one side. Cut double, following the line. Bend the flat end back when attaching the flower to a stem.

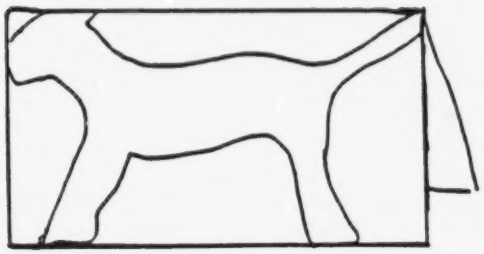
**STAMENS:**

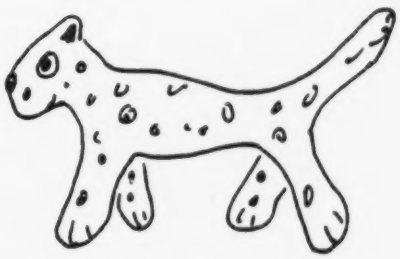
This is the center of the flower that bears the pollen of the flower. Many flowers have very long showy stamens. You may wish to put a cluster in the center of your flower.

- Cut long 1/4 inch strips of paper. Curl one end of each, either by pulling the paper between the open blade of a scissor and your thumb, or rolling on one end. Glue in the center of your flower.

**BIRDS AND ANIMALS:**

- Find a picture of your bird or animal in a book.
- Get a piece of butcher paper large enough for your animal's size. Get another piece of paper the same size and fasten them together on top of one and other.
- Sketch the outline of your animal on the top piece.
- Cut double, following your lines.
- Paint the animal's markings, coloring, eyes, etc. on both pieces.
- When the paint dries, staple the edges together, leaving an opening big enough to stuff the animal.
- Stuff the animal and staple shut the stuffing hole.





LESSON FOUR

# THE RAINFOREST SPEAKS

"They looked around in wonder at the huge trees and the ferns. The trees seemed to tower up almost out of sight. 'You know, this rainforest took four hundred million years to grow,' said Alice. The White Rabbit lifted a weary head. 'That's a long, long time,' he said sleepily. 'It makes me very tired to even imagine it.' 'It makes it very precious,' said Alice softly. 'Probably the most precious thing in the world!'"

*Nadine Amadio*
The New Adventures of Alice In Rainforest Land

## OBJECTIVES

- to use facts learned in previous lessons
- to learn the meaning of the word "anthropomorphism"
- to develop a written speech for a rainforest plant or animal
- to deliver a speech

**GRADE LEVEL:** Grades 3 - 8

**TIME:** One class period

## MATERIALS

- paper and pencil

## PROCEDURE

1. Discuss what the word anthropomorphism means ("An interpretation of what is not human or personal in terms of human or personal characteristics" - *Webster's Collegiate Dictionary*) . Ask the students to give you anthropomorphic examples from their experience (ex: nursery rhymes, animal stories, sports symbols, cartoons, advertising, etc.)

2. Ask each student to choose one plant or animal they worked on while building the rainforest and find out as much as possible about their choice.

3. Have them write a short speech about their plant or animal, in the first person, as if their chosen organism could speak as a human. Ask them to include information about the organism, feelings the organism might

have and information in general that the organism wants to convey to the world.

4. After the speech is written, the students should practice giving their speech in a dramatic manner. They may wish to make and wear masks for the final presentation.

5. When everyone is prepared they should reassemble their rainforest in its six-foot square, placing themselves in the appropriate forest level. From this vantage point they should deliver their speeches to an audience (the class next door, parents, a school assembly, etc.) An alternative approach would to be to assemble the class in the rainforest they built and have them speak from the section of the forest their organism occupies.

6. Debrief this activity by questioning the students as to whether being able to express their organism's feelings and thoughts in words made a powerful impact on the audience. Was an impact made? Why or why not? What evidence did you see or hear that led them to believe that anthropomorphism was a useful technique? Why do they think advertising, sports and literature uses anthropomorphism? Have the students record these responses in a discussion of anthropomorphism in their journal.



© SPICE

LESSON FIVE

# RAINFOREST CHOICES NO. 1

"So long as we continue traditions like marake, we will keep our identity and our spiritual strength. The day marake goes, that day will be the end of the Wayanas."

*Cognat*
a person of the Wayana Tribe, Surinam, South America

## INTRODUCTION

The intent of this lesson is to provide an historical perspective of human life in the pre-Columbian rainforest, as well as portray the existence of present day indigenous people there. The situations are generic and combine the life-styles of many groups. The teacher should discuss with students which situations are historical and which are totally modern.

## OBJECTIVES

- to become familiar with an example of human existence in a New World rainforest, both from the historical and modern perspective
- to work cooperatively in a group
- to make decisions based on the evidence available
- to examine a life-style other than their own
- to learn about adapting to an environment
- to experience oral storytelling as a means of passing on traditions and history

**GRADE LEVEL:** Grades 3 - 8

**TIME:** Three class periods

## MATERIALS

- ❑ 6 different *Group Information Sheets* (pp. 40 - 45)
- ❑ *Rainforest Slides* from the back of this book
- paper, pencil, crayon, felt tip pens, chart paper
- books from the school library or from the *Resource List* included with this unit that relate to New World rainforest people.

## PROCEDURE

1. As background for this lesson, review the slides at the end of this book, or show the National Geographic video to reinforce the previous lessons about the nature of the rainforest. Tell the students they are about to do an activity that is not based on one particular indigenous rainforest group, but a generic overview of rainforest groups. Some of the groups will be working with historic situations and some with modern.

2. Divide the class into six groups of five or six students.

3. Have each group choose a reader, a reporter, a recorder, an artist and a traveler/supply person.

4. Give each group a different *Group Information Sheet*. Review the instructions that appear on these sheets with each group. Each group must become familiar with its information in about ten minutes, then send a traveler to bring back information from other groups that might be useful in making a decision. Each group should give its traveler specific ideas about needed information they want him or her to bring back. Using this information and information the group already has, the group must decide how to solve the problem posed on its sheet. Each group must present a report on its problem and the decision they made. It should include the reasons they feel their decision was the best one based on the evidence they had. Each group must produce graphics (chart paper size) to go along with the report. At least one class period should be dedicated to production, the next one reporting.

5. Each group shares its report with the class. Each report will serve to give a little more information about the life of the indigenous people of the rainforest, both past and present.

6. Debrief the activity by discussing the various scenarios and the solutions the groups came up with. List on chart paper those things the students now thinks they know about the indigenous rainforest people. Discuss whether this is a complete picture. Why? Why not? Have the students write about their group's problem and solution in their journal.

## SUGGESTED FOLLOW-UP ACTIVITIES

☞ Read further about rainforest people. Perhaps the students or teacher could read aloud to the class from *People of the Tropical Rainforest*, by Julie Denslow and Christine Padoch.


© SPICE

☞ Write a fictional story pretending you are a child in the tropical rainforest, or write a journal about one week in the life of a child living in the rainforest.



© SPICE

RAINFOREST CHOICES NO.1

# GROUP ONE

## INSTRUCTIONS

- Your group has ten minutes to get to know the information on this sheet.
- Think about your group problem and give some directions to your traveler, so she or he can collect the information you need.
- The reporter exchanges ideas with the traveler in each group.
- Decide on a group solution to your problem.
- Write a group report about your problem and the solution you chose. Be sure to tell why this is the best solution based on the information you had.
- Draw a large illustration on chart paper to support the presentation of your report.
- You may use any of the books in the classroom for your report or illustration.
- Report to the class.

## GROUP PROBLEM

- You are a small group of farmers living in the Amazon Forest. You have built a temporary village of palm thatch houses and now you must decide what to grow in the small part of the forest you have cut and burned. Traditionally, you have fruit trees and some forest trees at the edges of your plot, so the forest can grow back when you move on. Should you grow corn or manioc on this clearing?

## INFORMATION

CORN: (This does not grow in all soils )

- You plant 2 or 3 kernels of corn at a time, in a hole you poke with a stick.
- Corn is the fastest growing crop. It can be harvested in 2 months.
- Corn does not have to be weeded, because it grows so fast, but it must be replanted. Corn does not store well in wet climates.
- Corn makes a big demand on the nutrients in the soil. You will probably have to move and burn down a new section of the forest in a year, if corn is your main crop. The forest will grow back quickly because of weeds.

MANIOC: (This plant does not deplete the soil nutrients quickly.)

- Manioc is planted from cuttings, in mounds. Manioc tubers grow in 6 to 8 months, but can continue to grow and be stored underground 18 months or more.
- Manioc must be weeded to save the soil nutrients, but uses the nutrients slowly. Manioc is very nutritious.
- You can use the same field for 3 or 4 years.
- "Bitter" manioc contains prussic acid and must be leached before eating. Sweet manioc can be grown and eaten like sweet potatoes.



© SPICE

RAINFOREST CHOICES NO. 1

# GROUP TWO

## INSTRUCTIONS

- Your group has ten minutes to get to know the information on this sheet.
- Think about your group problem and give some directions to your traveler, so she or he can collect the information you need.
- The reporter exchanges ideas with the traveler in each group.
- Decide on a group solution to your problem.
- Write a group report about your problem and the solution you chose. Be sure to tell why this is the best solution based on the information you had.
- Draw a large illustration on chart paper to support the presentation of your report.
- You may use any of the books in the classroom for your report or illustration.
- Report to the class.

## GROUP PROBLEM

- You are a group of Amazon Forest hunters. You hunt with bows, arrows, blow guns, spears, snares, nets and camouflaged pits. You have a problem finding tool tips, because there are no stones on the surface of the soil. Most river banks contain only mud or sand. What will you use for tool tips? Where and how will your group get this material? What will you hunt? This determines what you will make. (Example: bird arrows are smaller than ones used on tapirs.)

## INFORMATION

- Sharp, hard objects in your environment that can be made into points are: hardwood trees like mahogany, monkey bones, stingray spines, hard palm wood and bamboo.
- Your group can take lengthy trips to the headwaters of rivers to find stones.
- Your group can make nets out of vines and you can dig camouflaged pits.
- Your group can make every arrow and blow gun dart count, by tipping them in a solution made from the poison arrow frog.
- Your group can make nets of palm fiber and vines. You can also make snares from these materials.

© SPICE

RAINFOREST CHOICES NO. 1

# GROUP THREE

## INSTRUCTIONS

- Your group has ten minutes to get to know the information on this sheet.
- Think about your group problem and give some directions to your traveler, so she or he can collect the information you need.
- The reporter exchanges ideas with the traveler in each group.
- Decide on a group solution to your problem.
- Write a group report about your problem and the solution you chose. Be sure to tell why this is the best solution based on the information you had.
- Draw a large illustration on chart paper to support the presentation of your report.
- You may use any of the books in the classroom for your report or illustration.
- Report to the class.

## GROUP PROBLEM

- Your tribe lives in the Amazon Basin Rainforest. In the forest it is very hot and humid. No breeze penetrates the forest floor. It rains frequently. Traditionally your tribe wears little clothing. There are people from outside your portion of the forest who are covered in clothing from head to toe. They are urging your group to adopt their way of dressing. Should your group dress like these people?

## INFORMATION

- Your group has feet that are calloused and used to being bare on the forest floor. Shoes make noise in the underbrush, scaring away the game.
- When it rains, the rain runs off bare bodies; clothing stays wet.
- Insects that bother you are taken care of by your knowledge of the bug repellent qualities of some of the local plants. The outsiders protect their bodies with clothes.
- Clothes are hot and hard to keep clean in the rainforest. Your group can clean their bare bodies anytime you are near water.
- Clothes can protect your body from the many spines and thorns in the forest.
- The outsiders say it is proper to wear clothes. Your group doesn't understand what this means. It is natural in your society to be mostly bare-skinned. Wearing things on your body in your society is done for modesty and ceremonial reasons. Your definition of modesty is different from the outsider's. You decorate your body with painted designs.
- The outsider's clothes are pretty colors. Your group would like to own some of the cloth.



© SPICE

RAINFOREST CHOICES NO.1

# GROUP FOUR

## INSTRUCTIONS

- Your group has ten minutes to get to know the information on this sheet.
- Think about your group problem and give some directions to your traveler, so she or he can collect the information you need.
- The reporter exchanges ideas with the traveler in each group.
- Decide on a group solution to your problem.
- Write a group report about your problem and the solution you chose. Be sure to tell why this is the best solution based on the information you had.
- Draw a large illustration on chart paper to support the presentation of your report.
- You may use any of the books in the classroom for your report or illustration.
- Report to the class.

## GROUP PROBLEM

- Your hunting group has walked to the edge of the forest and found a very large river. There are many big fish near the center of the river. On the other side the group can see much game. Your tribe's life would be easier if you could navigate this river. Since no one in the group can swim for long distances without tiring, your group must invent a solution from the materials available. Invent a way to travel on this river.

## INFORMATION

- There is a "big belly" palm growing near the beach. If soft pith from the center is removed you have a bathtub shaped piece.
- The purpleheart tree is also growing nearby. This tree has inch thick bark that can be cut away from the trunk in one curved piece. It floats and can be shaped.
- Spanish cedar trees are growing and they are known to be resistant to insect attack and rot. The wood is also light and easy to carve.
- The group will need some cutting tools. What is available?
- Bamboo-like reeds are growing along the river. They rot rather quickly and eventually get water logged. Vines are available to use for lashings, but they also rot quickly in water.
- Curved, rather than flat surfaces, move through the water more swiftly and are easier to steer.
- The invention must be controllable in swift water.

© SPICE

RAINFOREST CHOICES NO.1

# GROUP FIVE

## INSTRUCTIONS

- Your group has ten minutes to get to know the information on this sheet.
- Think about your group problem and give some directions to your traveler, so she or he can collect the information you need.
- The reporter exchanges ideas with the traveler in each group.
- Decide on a group solution to your problem.
- Present this solution in the oral format of your choice.
- Your group may use any of the books about the rainforest in the classroom for ideas.
- Your group may wish to make props, masks and costumes.
- Perform for the class.

## GROUP PROBLEM

- You are a group of hunters. You must know a lot about your environment in order to provide for your group and to survive in a tropical rainforest environment. Develop a body of knowledge to pass on to the new hunters in your group. Select those things you as a group feel are important to the hunt. Make a learning chant, as yours are oral traditions.

## INFORMATION

- The longest, straightest, lightest arrow shafts come from giant grass. Sharpened monkey bones make good tips.
- *Huacapu* wood makes the best house posts.
- Tapirs like seeds of the *Aku* tree. Monkeys like *Inui* tree fruit. Peccaries eat the fruit that falls on the ground. Toucans love the fruit of the *Fingugi* tree. Grasshoppers eat the roots of the *Takisa* tree.
- The *Mauritia Palm*, the *Peach Palm*, and the *Iriartea Palm* make good strong spears.
- *Kofi* tree wood makes good fishing traps.
- Good hunters can identify trees by smell and taste.
- Poison Arrow Frogs live in *tank bromeliad* plants
- Hunters can smell where animals like peccaries have been.
- *Heliconia* plants often grow near water.
- Certain types of birds follow ant swarms.



© SPICE

RAINFOREST CHOICES NO.1

# GROUP SIX

## INSTRUCTIONS

- Your group has ten minutes to get to know the information on this sheet.
- Think about your group problem and give some directions to your traveler, so she or he can collect the information you need.
- The reporter exchanges ideas with the traveler in each group.
- Decide on a group solution to your problem.
- Write a group report about your problem and the solution you chose. Be sure to tell why this is the best solution based on the information you had.
- Draw a large illustration on chart paper to support the presentation of your report.
- You may use any of the books in the classroom for your report or illustration.
- Report to the class.

## GROUP PROBLEM

- A road has just been opened to your part of the forest. Your tribe's environment is being destroyed. Animals and plants that you need to survive are disappearing. The newcomers appear to be violent when they don't get their way. You notice an increase in sickness among the people of your group who have had contact with these new people. Consult with other groups and your group to decide whether to retreat into the forest further or become a part of the new society and take your chances at survival.

## INFORMATION

- Your group can live on the reserve set aside for your tribe, but the deforestation outside your reserve is having devastating effects on your land and animals. Squatters are invading your land.
- You will have access to candy and canned food and modern machines, but you have limited resources to trade for these items.
- The courts of law say you have legal rights to your land. The laws are difficult to enforce. The government thinks that you will become part of the general population.
- You are treated like a child by the newcomers. They seem to think you are not very smart.
- To retreat gives you time to defend yourself better on your own turf. It also gives you time to think of a solution to your problem. There is however, limited forest left.
- You can fight with the newcomers, but your group is small in number, ill-armed and there are many well-armed people in their group.
- You can join with other indigenous groups to form a larger more powerful front.
- Your group can move to the reserve and send your children to school.

© SPICE

LESSON SIX

# STORIES OF THE RAINFOREST

Whining like forest dogs, Rustling like budding trees,
Bubbling like thawing springs, Humming like little bees,
Crooning like Maytime tides, Chattering parrot words,
Crying the panther's cry, Chirping like mating birds,
Thus, thus, we learned to speak...

*Vachel Lindsey*
Eden in Winter

## OBJECTIVES

- to become familiar with some oral traditions of the rainforest
- to work cooperatively in a group
- to make decisions based on the evidence available
- to examine a life style other than their own
- to experience oral storytelling as a means of passing on traditions and history

**GRADE LEVEL:** Grades 3 - 8

**TIME:** Two to three class periods

## MATERIALS

- ❑ copies of *A Man with a Curious Mind* (p. 49) and *How We All Grew From Palm Seeds* (p. 53).
- these books, if possible, from the resource list:
  Joanna Troughton, *How the Birds Changed Their Feathers*
  Helen Cowcher, *How Night Came,*
  Martin Elbl and J. Terry Winik, *Rainforest, Tales from the Amazon,*

## PROCEDURE

1. Divide your class into groups of 5 or 6. Each group needs to choose a reader, a storyteller or storytelling leader, an oral recorder (this person must remember and be able to retell his/her group's story), a sound effects person, an art consultant and an encourager.

© SPICE

2. Assign one of the five stories to each group. If you do not have the four books from the *Resource List*, have more than one group work on the stories you do have.

3. Discuss with the class ways that societies which do not read and write might pass down their history and traditions. How does a child learn what he/she needs to know, without going to a school as we know it? As they think of answers, list them on the chalkboard. If ideas are slow in coming, suggest storytelling, chanting, song and dance, pantomime, acting stories out with masks, etc.

4. The groups then proceed to read their stories and plan how they will share their stories with the class. Encourage them to be innovative. The groups that work on the Von Humboldt story should be instructed to keep in mind that Von Humbolt was a man of the 18th century. Europeans of that period had little knowledge of the societies inhabiting the American continent, which led to a common perception of the indigenous people as "half-savage Indians." Instruct the group to tell their stories through the eyes of indigenous people of the forest. Ask students to keep in mind the environment and nature of the people of the rainforest. How long this takes is up to you and the needs of the group.

5. Each group gives its oral presentation. Discuss how students felt about this way of teaching and learning. What have you learned that did not come out of a book? How did you learn it? Are some things better taught by methods other than reading? What? How would you teach them? What would a rainforest-educated child know that you might not know?

## SUGGESTED FOLLOW-UP ACTIVITIES

☞ Have each child in the class tell about a family tradition or historical event, using the oral storyteller method.

☞ Plan a day of instruction that is totally oral, with no written work or reading on the part of the students or teacher.





© SPICE

# A MAN WITH A CURIOUS MIND

By Carol E. Murphey

Friedrich Heinrich Alexander Baron von Humbolt, was a man with a curious mind. He was born in Berlin in 1769. As a very young man he developed an interest in science, particularly the science of botany. His interest in plants lead him to the most remote rainforests of South America. On June 25, 1799, he and his friend Aimé Bonpland set sail on an expedition of exploration to study tropical plants. They arrived in Cumaná, Venezuela on July 16, 1799. His first view of the tropics overwhelmed him. He wrote to his brother:

> *"What an extravagant country we are in! Fantastic plants, electric eels, armadillos, monkeys, parrots: and many, many, real, half-savage Indians." What trees! Coconut palms, 50 to 60 feet high; Poinciana Pulcherrima with a big bouquet of wonderful crimson flowers; Pisang and a whole host of trees with enormous leaves and sweet smelling flowers as big as your hand, all utterly new to us. As for the colours of the birds and fishes - even the crabs are sky-blue and yellow!*
>
> *Up until now we have been running around like a couple of mad things; for the first three days we couldn't settle to anything; we'd find one thing, only to abandon it for the next. Bonpland keeps telling me he'll go out of his mind if the wonders don't cease soon."*

This enthusiasm carried the two of them through tropical South America for two years. A large part of this adventure was to take place in the rainforests of the basins of the Orinoco and Amazon Rivers. They identified, pressed and sketched plants, animals, people and places of the regions they visited.

At dawn, on March 30th, 1800, Humboldt and Bonpland set off in a dugout canoe on the Rio Apuré and then down the Atabapo River to the Rio Negro, the great northern tributary of the Amazon River. As they slid through the water they saw a fabulous array of bird and animal life. The river was a tunnel, with walls of green plants lining each side. Huge, twenty foot alligators slid off the bank to swim near the canoe or sat with their jaws wide open. The water was infested with piranha and sting rays. Flocks of birds so dense they darkened the sun, took to the sky. When they came ashore to camp, clouds of insects, mosquitoes, gnats, chiggers, sandflies and jejen descended upon them. All of

these bit and carried disease. Some insects even laid eggs under the skin of humans and left people in misery. Most people of this time would not take a river trip, not because of the fourteen foot anaconda snakes that swam beside the canoe, nor the fierce crocodiles, nor the hostile inhabitants, but because of *el sudar y las moscas* (the sweat and the flies). Jaguars also stalked the camp at night threatening the campers, as well as the animals. One ate Humboldt's dog. In the middle of the night the nocturnal animals would set up a great howling, groaning and crying, that often kept the men awake.

On May 10th, 1800, the expedition made a right turn into the "lost world" of the Casiquiare Canal. European geographers said this connecting branch between the Orinoco River and the Amazon did not exist, but Alexander von Humboldt and Aimé Bonpland were now gliding along its banks. They had a larger dugout here, but were very crowded. Besides themselves, Father Zhea, and Don Nicolas de Soto the local Governor's brother-in-law, they had 25 birds and monkeys in cages. They also had on board four Indian canoemen, a local river pilot and a mulatto cook-servant from Cumaná. These people were to help with boating, guiding and camping. The Indians along this stretch where thought to be people eaters and some of them were hostile to intruders. Humboldt and Bonpland lacked the knowledge of the environment that the local natives had and consequently nearly starved to death. The tropical wood was very wet and wouldn't burn. Their provisions from home were very low at this point. They were reduced to eating ants and small portions of dry cacao ground up with a small amount of sugar. They washed this down with large gulps of river water. Finally on May 21st, 1800, they reached the Orinoco River.

Alexander von Humboldt knew many of the famous people of his time. After his trip through the rainforest, he went to Bogotá, Colombia to meet with the world famous botanist, Don José Celestino Mutis. Mutis was seventy years old at the time. He had studied, in his youth, under Linnaeus, originator of the plant classification system in use today. Mutis is remembered today for his studies of quinine and of malaria control and the classification of over twenty thousand plants.

Humboldt traveled many places after his rainforest adventure. He became a friend of Thomas Jefferson and visited him at the White House and at Monticello in Virginia. Jefferson considered Humboldt to be the greatest scientific man of his age and, in turn, Humboldt admired Jefferson's political views. On May 6, 1859, just after his ninetieth birthday, Alexander von Humboldt died at home in Berlin.


© SPICE

## "HOW WE ALL GREW FROM PALM SEEDS"

A Carib Indian Tale of the Big Flood

As retold by Carol E. Murphey

One day a long, long time ago, when our ancestors lived among the rocks of Encaramada, in the country that is now called Venezuela, the sun didn't rise. A man and a woman went out to gather palm seeds for their breakfast, even though it was very dark. As they gathered palm fruit, they noticed that the sky was very angry and black and that the water was making huge waves that were beating, one by one, against the rocks of Encaramada. Needless to say our ancestors were very frightened. They began to run. The waves beat and crashed, wearing away the rocks. The water began to crawl up upon the land, covering everything. First it covered the sand and then the grass and then the bushes. As it rose toward the tree tops all the animals began to struggle and drown, including the relatives of our ancestors. Finally, there were but two survivors, the man and the woman, who had been gathering palm seeds to eat. Through all the beating waves and drowning animals, they had crawled exhausted to the top of the high mountain of Tamanacu. There the sun found them the next day. At dawn the waves had stopped and the water began to recede. Our two remaining ancestors, the man and the woman, slowly began to climb down from that high place. As they descended, they ate the palm fruit they had gathered the morning before and placed in the woman's apron. As they ate they threw behind them the seeds of the Mauritia Palm. As each seed touched the ground a new man or woman rose up to repopulate the earth and that is why you and I are here today.

© SPICE

LESSON SEVEN

# WHAT'S FOR DINNER?

"These semi-wild fruits of the tropical forest, such as spondias, pochotes, granadillas, naranjillas, carbolas, guanabanas, zapotes, pepinos, and scores of other little known succulences, offer a visual document of the diversity of the Neotropical flora. At the same time they speak eloquently of the prominent role that frugivory fruit-eating plays in the lives of Neotropical trees and animals."

*Adrian Forsyth and Ken Miyata*
Tropical Nature

## OBJECTIVES

- to work cooperatively in a group
- to examine a life style other than our own
- to make decisions based on the evidence available
- to use the four basic food groups to look at nutrition
- to become familiar with the food value of rainforest foods

**GRADE LEVEL:** Grades 4 - 8

**TIME:** One class period

## MATERIALS

- ❑ *Family Role Cards* (p. 56, cut and pasted onto appropriate-sized index cards)
- ❑ two sets of *Survival Cards* (p. 60, cut and pasted)
- ❑ two sets of *Four Food Groups Explanation Cards* and *Game Boards* (p. 63)
- two dice

## PROCEDURE

1. Divide the class into two family tribal groups. Each tribal member picks a card from the *Family Role Cards*. The card should be chosen without the student seeing the role ahead of time (girls can have boy roles and vice-versa). Each tribal group should select a recorder that fills in the game board and a reader to help that person find the items quickly. This role can be passed around the group as the game progresses.

2. Everybody reads his/her role card. People within a tribe with like roles should sit together. Make sure that most of the roles are represented in each group.

3. Each of the tribes should obtain a die, the *Four Food Groups, Explanation Card and Game Board,* and the *Survival Cards.* Read the instructions and prepare to play the game. It is helpful if the teacher makes the cards beforehand.

4. Give the class the following game rules:

   - You have to roll an odd number to draw a card
   - For a card to count it must be something your role card says you do (example: only a hunter can shoot large animals)
   - All cards go to the bottom of the pile after they are read
   - If a card calls for action, such as telling a story, you must do it for the group

5. Both tribes start playing at the same time. The teacher indicates how long they can play. The object of the game is to collect the portions of food suggested in each of the four food groups, thereby insuring the health and survival of your tribe.

6. Debrief the activity by discussing each tribe's results. If one or both tribes fail to reach the goal, discuss strategies to solve the problem. Have each group choose a reporter and recorder. Give each group ten minutes to decide on the answers they wish to give to the following questions:

   - Was it difficult or easy to get enough to eat? Why?
   - Were some of the foods things you found strange? Would a rainforest person find some of our food strange? Give some examples.
   - How did you feel about your family group? Were they committed to helping you survive?
   - Did anything unusual happen to your group? What?
   - How did that event make you feel? Why?
   - If your group didn't get all the food you needed, what ideas could you discuss with the other group that would help your group survive?



© SPICE

## SUGGESTED FOLLOW-UP ACTIVITIES

☞ Have a tropical food tasting. You will need some of the following: yucca, red bananas, manioc flour, fresh pineapple, fresh papaya, tamarind, guava, cashews, brazil nuts, cocoa, mangos, catfish, blue corn, etc. These items are often in the fresh produce or health food department of your local supermarket. Other items can be found in Latin American grocery stores.

© SPICE

# FAMILY ROLE CARDS

**Boy Child**

You are four years old. You spend your day practicing with the bow and arrow, to be a hunter. Your father and the other hunters teach you about the plants and animals of the forest. You also like to swim in the nearby stream and often try to catch fish. Your father is teaching you how to stun fish or catch them in nets and traps. When your mother can catch you, she makes you work in the family garden. Sometimes you climb small trees for fruit.

**Boy Child**

You are seven years old. You spend your day practicing with the bow and arrow to be a hunter. Your father and the other hunters teach you about the plants and animals of the forest. You also like to swim in the nearby stream and often try to catch fish. Your father is teaching you how to stun fish or catch them in nets and traps. When your mother can catch you, she makes you work in the family garden. Sometimes you climb small trees for fruit. You have a lot of insect bites.

**Boy Child**

You are eight years old. You spend your day practicing with the bow and arrow, to be a hunter. Your father and the other hunters teach you about the plants and animals of the forest. You also like to swim in the nearby stream and often try to catch fish. Your father is teaching you how to stun fish or catch them in nets and traps. When you mother can catch you, she makes you work in the family garden. Sometimes you climb small trees for fruit. You have a crippled foot.

**Boy Child**

You are eight years old. You spend your day practicing with the bow and arrow, to be a hunter. Your father and the other hunters teach you about the plants and animals of the forest. You also like to swim in the nearby stream and often try to catch fish. Your father is teaching you how to stun fish or catch them in nets and traps. When your mother can catch you, she makes you work in the family garden.

**Boy Child**

You are eight years old. You spend your day practicing with the bow and arrow, to be a hunter. Your father and the other hunters teach you about the plants and animals of the forest. You also like to swim in the nearby stream and often try to catch fish. Your father is teaching you how to stun fish or catch them in nets and traps. When your mother can catch you, she makes you work in the family garden. Sometimes you climb small trees for fruit. You have a pet monkey.

**Boy Child**

You are nine years old. You spend your day practicing with the bow and arrow, to be a hunter. Your father and the other hunters teach you about the plants and animals of the forest. You also like to swim in the nearby stream and often try to catch fish. Your father is teaching you how to stun fish or catch them in nets and traps. When your mother can catch you, she makes you work in the family garden. Sometimes you climb small trees for fruit.

**Girl Child**

You are eight years old. You work as hard as an adult. You have already learned about the plants and animals of the forest. You know the best places around to find food. You work in the family garden plot. You also spend part of the day grinding corn or manioc with your mother. You get to look after your younger brother and the new baby. Your younger brother often gets in trouble, because he is not as careful of dangerous things as he should be.



© SPICE

**Girl Child**

You are nine years old. You work as hard as an adult. You have already learned about the plants and animals of the forest. You know the best places around to find food. You work in the family garden plot. You also spend part of the day grinding corn or manioc with your mother. You get to look after your younger brother and the new baby. Your younger brother often gets in trouble, because he is not as careful of dangerous things as he should be.

**Girl Child**

You are ten years old. You work as hard as an adult. You have already learned about the plants and animals of the forest. You know the best places around to find food. You work in the family garden plot. You also spend part of the day grinding corn or manioc with your mother. You get to look after your younger brother and the new baby. Your younger brother often gets in trouble, because he is not as careful of dangerous things as he should be.

**Girl Child**

You are eleven years old. You work as hard as an adult. You have already learned about the plants and animals of the forest. You know the best places around to find food. You work in the family garden plot. You also spend part of the day grinding corn or manioc with your mother. You get to look after your younger brother and the new baby. Your younger brother often gets in trouble, because he is not as careful of dangerous things as he should be.

**Girl Child**

You are eleven years old. You work as hard as an adult. You have already learned about the plants and animals of the forest. You know the best places around to find food. You work in the family garden plot. You also spend part of the day grinding corn or manioc with your mother. You get to look after your younger brother and the new baby. Your younger brother often gets in trouble, because he is not as careful of dangerous things as he should be.

**Girl Child**

You are thirteen years old. You work as hard as an adult. You have already learned about the plants and animals of the forest. You know the best places around to find food. You work in the family garden plot. You also spend part of the day grinding corn or manioc with your mother. You get to look after your younger brother and the new baby. Your younger brother often gets in trouble, because he is not as careful of dangerous things as he should be. You will soon be married.

**Hunter**

You are twenty-five years old. You are very smart and know the habits of the forest animals. You are very quiet in the forest and can sneak up on game. You can identify over 300 species of plants and trees by their leaves, their smell, and their taste. This helps you track animals. You are considered by your family to be a good provider. You can shoot birds out of the air with one arrow. You also know the wood to use to make good bows and arrows. You help train the young men of your family in the ways of the forest. You help clear the fields by cutting and burning the forest. You are married.

**Hunter**

You are twenty-seven years old. You are very smart and know the habits of the forest animals. You are very quiet in the forest and can sneak up on game. You can identify over 300 species of plants and trees by their leaves, their smell, and their taste. This helps you track animals. You are considered by your family to be a good provider. You can shoot birds out of the air with one arrow. You also know the wood to use to make good bows and arrows. You help train the young men of your family in the ways of the forest. You help clear the fields by cutting and burning the forest. You are married and have two boy children.

**Hunter**

You are twenty-two years old. You are very smart and know the habits of the forest animals. You are very quiet in the forest and can sneak up on game. You can identify over 300 species of plants and trees by their leaves, their smell, and their taste. This helps you track animals. You are considered by your family to be a good provider. You can shoot birds out of the air with one arrow. You also know the wood to use to make good bows and arrows. You help train the young men of your family in the ways of the forest. You help clear the fields by cutting and burning the forest. You are sick with dysentery. The Shaman is planning a curing ceremony for you.

© SPICE

**Hunter**

You are twenty years old. You are very smart and know the habits of the forest animals. You are very quiet in the forest and can sneak up on game. You can identify over 300 species of plants and trees by their leaves, their smell, and their taste. You are considered by your family to be a good provider. You can shoot birds out of the air with one arrow. You also know the wood to use to make good bows and arrows. You help train the young men of your family in the ways of the forest. You help clear the fields by cutting and burning the forest. You are looking for a suitable bride from a neighboring tribe.

**Hunter**

You are sixteen years old. You are very smart and know the habits of the forest animals. You are very quiet in the forest and can sneak up on game. You can identify over 300 species of plants and trees by their leaves, their smell, and their taste. You are considered by your family to be a good provider. You can shoot birds out of the air with one arrow. You also know the wood to use to make good bows and arrows. You help train the young men of your family in the ways of the forest. You help clear the fields by cutting and burning the forest. You sleep in a house with other unmarried young men.

**Hunter**

You are fifteen years old. You are very smart and know the habits of the forest animals. You are very quiet in the forest and can sneak up on game. You can identify over 300 species of plants and trees by their leaves, their smell, and their taste. You are considered by your family to be a good provider. You can shoot birds out of the air with one arrow. You also know the wood to use to make good bows and arrows. You help train the young men of your family in the ways of the forest. You help clear the fields by cutting and burning the forest. You sleep in a house with other unmarried young men.

**Hunter**

You are fourteen years old. You are very smart and know the habits of the forest animals. You are very quiet in the forest and can sneak up on game. You can identify over 300 species of plants and trees by their leaves, their smell, and their taste. You are considered by your family to be a good provider. You can shoot birds out of the air with one arrow. You also know the wood to use to make good bows and arrows. You help train the young men of your family in the ways of the forest. You help clear the fields by cutting and burning the forest. You sleep in a house with other unmarried young men.

**Married Woman**

You are twenty-seven years old and have four children. You had two other children, but they died as babies. Most days you grind corn or manioc with the other women. You gather fruits and mushrooms in the forest. Sometimes you bring grubs or ants back for your family to eat. You work in the family garden. You like to swim and splash in the stream with the children. Sometimes you make necklaces out of seeds and teeth. You clean and cook animals the hunter finds. You have malaria.

**Married Woman**

You are twenty-six years old and have three children. You had two other children, but they died as babies. Most days you grind corn or manioc with the other women. You gather fruits and mushrooms in the forest. Sometimes you bring grubs or ants back for your family to eat. You work in the family garden. You like to swim and splash in the stream with the children. Sometimes you make necklaces out of seeds and teeth. You weave palm fronds and grass to make house walls and roofs.

**Married Woman**

You are twenty-six years old and have three children. You had two other children, but they died as babies. Most days you grind corn or manioc with the other women . You gather fruits and mushrooms in the forest. Sometimes you bring grubs or ants back for your family to eat. You work in the family garden. You like to swim and splash in the stream with the children. Sometimes you make necklaces out of seeds and teeth. You clean and cook animals the hunter finds. You have sandfly larva hatching under the skin of your feet. They must be dug out.

**Married Woman**

You are twenty-two years old and have three children. You had two other children, but they died as babies. Most days you grind corn or manioc with the other women. You gather fruits and mushrooms in the forest. Sometimes you bring grubs or ants back for your family to eat. You work in the family garden. You like to swim and splash in the stream with the children. Sometimes you make necklaces out of seeds and teeth. You are the tribal expert on body painting.



© SPICE

## Married Woman

You are twenty years old and have one child. You had two other children, but they died as babies. Most days you grind corn or manioc with the other women. You gather fruits and mushrooms in the forest. Sometimes you bring grubs or ants back for your family to eat. You work in the family garden. You like to swim and splash in the stream with the children. Sometimes you make necklaces out of seeds and teeth. You weave hammocks and ropes from plant fibers.

## Married Woman

You are sixteen years old and have two children. Most days you grind corn or manioc with the other women. You gather fruits and mushrooms in the forest. Sometimes you bring grubs or ants back for your family to eat. You work in the family garden. You like to swim and splash in the stream with the children. Sometimes you make necklaces out of seeds and teeth. You clean and cook animals the hunter finds.

## Grandmother

You are thirty-five years old. You have had many children; three are living. You know a lot of the tribal history. You tell this to the adults and children in wonderful stories told on rainy days or at night by a fire. You have mastered the building of houses and know just which trees and plants are best. You are the tribal expert on what is good to eat and where it can be found. You grind corn or manioc with the other women.

## Great-Grandmother

You are sixty-eight years old. Your only son was killed by a snake bite. You have three grandsons and one great-grand daughter. You know a lot of the tribal history. You tell this to the adults and children in wonderful stories told on rainy days or at night by a fire. You have mastered the building of houses and know just which trees and plants are best. You are the tribal expert on what is good to eat and where it can be found. You grind corn or manioc with the other women. You know how to make Kasili, the drink made from boiled manioc root, that is then chewed and spit in a pot to ferment.

## Shaman

You are the oldest male in the village. You are seventy-two. Your tribe depends on you for their spiritual and physical well being. You know all about the trees, plants, animals and insects of the forest that can cure sickness and chase off evil spirits. You make necklaces of jaguar teeth to make hunters strong. You know all the secret curing chants. You collect bark and fungus and flowers and other necessary things in the forest for your cures. Many of your cures are very effective and people from the cities are interested in your secrets. You also hunt, fish and work in the garden. You are training several men of your group to follow in your footsteps.

## Shaman

You are thirty years old. You are an apprentice to the Shaman. You are learning all about the trees, plants, animals and insects of the forest that can cure sickness and chase off evil spirits. You are studying the Shaman's rituals and secret curing chants. You collect bark and fungus and flowers and other necessary things in the forest, for the Shaman's cures. You will be one of the tribe's next spiritual leaders and doctors. You also hunt, fish and work in the garden.

© SPICE

# SURVIVAL CARDS

Please cut along the dotted lines and paste onto index cards of appropriate size.

| | |
|---|---|
| You just shot at and missed a 20 pound paca. It is a tasty rodent fish used for calcium. | You bring a bunch of bananas from the garden. |
| You scoop up twenty tiny fish. Eat them whole. | Deer eat your manioc plants during the night. |
| You bring back a basket of inga fruit. Everyone is happy. | Your corn gets ripe. You harvest it. |
| Time out while you dip your arrows in frog poison. | The papayas in your garden get ripe. |
| You find a special bark for curing malaria. | You play all day. |
| You spend the morning grinding manioc. | A wild pig knocks you down and gets away. |
| You find a snake skin, but luckily no snake. | You play in the water and scare away the fish. |
| You have cleared a new garden today. | You roast army ants for dinner. |



© SPICE

| | |
|---|---|
| **A caiman bites off your foot. You die.** | **You find some sapodillas.** |
| **It is raining. Your community is flooded.** | **If you are a Grandmother, you make kasili.** |
| **Leaf-cutting ants eat part of your garden.** | **You sing a grinding song as you grind manioc.** |
| **You harvest the fruit of the peach palm.** | **You collect a lot of berries.** |
| **You find tree fungus and bring it home.** | **A swarm of wasps stings you. You jump in the water.** |
| **You shot a parrot with an arrow.** | **You just speared a capybara.** |
| **You dig yams today.** | **You find a log full of grubs.** |
| **You find a wild sugar vine.** | **You dig up your sweet potatoes.** |
| **If you are 8 years old, you just found a clutch of turtle eggs.** | **You are covered with sores from insect bites. You hurt and itch at the same time.** |

© SPICE

| | |
|---|---|
| **If you are a child, play in the water.** | **You are a hunter following tapir tracks. You see an aku tree. A tapir is eating the seeds. You spear one.** |
| **You find a hive with wild honey.** | **You find a mauritia palm, the right size for a canoe. It is in fruit. You gather some. Nothing else is found today.** |
| **You get your body painted for a ceremony.** | **You get stung by a whip scorpion and get very sick.** |
| **Army ants invade your house.** | **You are sick today.** |
| **You catch two piranha.** | **You shoot an Orinoco goose.** |
| **You have to dig sandfly larvae out of your feet.** | **If you are over 12 years old, you get married today.** |
| **You are a Shaman and you cure a fever.** | **If you are a Grandmother, tell a story.** |
| **An emerald snake bites and kills you.** | **If you are a Shaman, show your apprentice where to find a plant for healing burns.** |
| **You make the noise of a macaw. One comes near, but you miss it.** | |



© SPICE

# Four Food Groups Explanation and Game Board

**EXPLANATION:**

You will have to place the food you get during the game in one of the four food groups. Please note the dietary goals in parenthesis. Each item underneath adequately fulfills the dietary needs of the tribe. The first tribal family to fill their card correctly survives. If you do not fill your card, you must discuss possible ways to survive with the other tribe. Some of these tropical foods are now grown commercially. They are derived from forest relatives. The following chart places tropical foods in the correct food group. Use it for your reference.

| DAIRY (calcium) Two of these | CEREALS (carbohydrates) Four of these | FRUITS AND VEGETABLES Four of these | MEAT (proteins) Two of these |
|---|---|---|---|
| tiny fish with bones<br>trout relatives<br>insect shells<br>iguana eggs<br>turtle eggs | manioc<br>sweet potato<br>yams<br>corn<br>macal<br>wild sugar vine<br>beans<br>palm hearts<br>wild honey | inga fruit<br>palm fruit<br>tree fungus<br>sapodilla<br>amarind<br>mamey<br>piqui fruit<br>cocona<br>star apple | paca<br>anteater<br>armadillo<br>grubs and bugs<br>capybara<br>monkey<br>birds<br>deer<br>wild pig<br>tapir |

GAME BOARD: Write the name of your food in the proper column.

| DAIRY (calcium) | CEREALS (carbohydrates) | FRUITS AND VEGETABLES | MEAT (protein) |
|---|---|---|---|
| | | | |

© SPICE

LESSON EIGHT

# A GREENHOUSE OUT OF CONTROL?

"This very complicated game of 'pass the hot potato' that is played between the earth's surface and selected gases in the atmosphere and it keeps the earth's average temperature at 35° C warmer than it would otherwise be. Without these absorbant gases in our atmosphere, the earth would not provide a suitable habitat for man and numerous other life forms."

*Frederick Lutgens and Edward Tarbuck*
The Atmosphere

## INTRODUCTION

The greenhouse effect has frequently been discussed by the press, members of which are usually not scientists and often have at best only a partial understanding of the research.

The current theorists fall into three camps: those who say global warming is already happening, those who tell us that warming is not happening, and those who say it is theoretically possible that it could happen. The majority of scientists fall into the latter category. The main arguments concern themselves both with the mathematical models being used for prediction and the semantic argument that one person's definition of "significant" is not necessarily the same as another's. Acceptance of the global warming theory has political and economic ramifications, with which governments are not eager to deal. There are also arguments, both positive and negative, over what the results of global warming will be. One small group is predicting a cooling trend. This argument is best summed up by Reid A. Bryson, a leading climate theorist at the University of Wisconsin. He says, "It is not that we have a bad theory, it's that we have an incomplete theory with a lot of bad science being done." For these reasons it is very important that students understand both what a theory is, and that this lesson, though demonstrating the greenhouse effect, does not prove that global warming is happening or will happen.

© SPICE

## OBJECTIVES

- to experiment with a scientific theory
- to work cooperatively in a group
- to practice thinking critically
- to describe the essential qualities of a theory
- to recognize the relationship between the greenhouse effect and human actions

**GRADE LEVEL:** Grades 3 - 8

**TIME:** One to two class periods

## MATERIALS

Each group will need:

- ❑ a copy of *Experiment Instructions* (p. 68) for each group
- a shoebox lined with black paper
- a piece of heavy plastic wrap
- masking tape
- a thermometer
- graph paper and pens
- as an optional extra you can use probe software to do this experiment. Sources: *Voyage of the Mimi* and *Science Tool Kit* by Brodabund Software

## PROCEDURE

1. Discuss with the students the definition of the word "theory." Older children might record their definitions on chart paper and then look the word up in the dictionary. With younger children you might want to proceed directly to the dictionary. In both cases you want to define what a theory is and underscore the idea that a theory *can* be an untested idea or opinion that is based on known facts or phenomena. It can serve as an argument or experiment by which you can find the truth. A theory *sometimes* can be defined as a hypothesis, i.e, an educated guess.

2. Tell the students that they are going to do an experiment that illustrates the greenhouse effect. The greenhouse effect occurs when short rays of light from the sun pass into our atmosphere and are absorbed by objects on the earth. The objects then put these rays back into the atmosphere in the form of long rays that are less capable of returning to outer space. Many of these long rays are trapped by the carbon dioxide and other gases that ring the earth. These trapped rays are what warms the earth. Scientists theorize that the greenhouse effect is being sped up by human


© SPICE

pollution and the destruction of vegetation. They fear this will cause climate changes that will harm life on earth.

3. Divide the class into six groups of five students each. Each group needs to choose a reporter, a recorder, a grapher, a box preparer and a timer/temperature taker.

4. Give each group a set of directions and read the experiment directions with the class.

## SUGGESTED FOLLOW-UP ACTIVITIES

☞ Assign homework that requires the student to experiment with the greenhouse effect using the family car or a room in their house. The experiment should include temperature readings over several periods of time and several situations.

☞ Discuss whether or not the Greenhouse Theory is simply an alarmist point of view. Is it occurring now?

© SPICE

# EXPERIMENT DIRECTIONS

1. One person from each group needs to obtain for your group: A thermometer, a piece of graph paper, colored pens, one large piece of plain paper, a shoebox with black interior, a piece of plastic wrap and masking tape.

2. The grapher prepares your graph by writing degrees in increments of ten on the vertical side of the paper, starting at 50°. Put reading 1, reading 2 and reading 3 across the bottom. You may make either a bar or plot graph.

3. The temperature-taker takes the temperature inside your shoe box. The grapher records that temperature on your graph paper at the intersection of "reading 1" and the appropriate degree.

4. The box-preparer secures your piece of plastic over the box opening with masking tape and places your sealed box in direct sunlight for ten minutes.

5. While the experiment is going on the whole group helps the recorder make a diagram of the experiment based on the teacher's discussion of the greenhouse effect. The whole group also records its predictions as to whether or not there will be a temperature increase.

6. After ten minutes the temperature-taker peels back a small section of the plastic on the box, inserts a thermometer and takes a reading.

7. The grapher records this reading in the appropriate place on the graph.

8. The remainder of the plastic is removed from the box by the box preparer. Place the box back into the light for five minutes.

9. The temperature-taker takes another reading at the end of the five minutes.

10. The grapher records this reading in the appropriate place on the graph.

11. The reporter shares the results of the experiment with the rest of the class. The reporter must be prepared by the group to answer these questions for the class:

    - What was your group's prediction and was it correct? Share your graph at this time.
    - How did the experiment demonstrate the greenhouse effect? Share your diagram at this time.
    - What does your group think would happen if the plastic were thicker?



© SPICE

- How does this experiment relate to the Greenhouse Effect Theory?
- Give one example of the greenhouse effect that you encounter in your daily life.*
- Can we really predict the effect of pollution on the future of our earth's atmosphere? Why? Why not?

* (Examples of greenhouse effect: a closed versus an open car, a closed versus an open window in a room, standing in the sun near a building wall versus standing in the open on a cold day, sun roofs, solar panels, etc.)

© SPICE

LESSON NINE

# GOOD MORNING U.S.A.

"Say tropics to many people and they immediately conjure up images of snakes, lizards, frogs and crocodiles lurking menacingly."

*Marston Bates*
The Land and Wildlife of South America

## OBJECTIVES

- to become familiar with rainforest products
- to work cooperatively in a group
- to practice thinking critically
- to recognize the relationship between him/herself and New World Tropical Rainforests

**GRADE LEVEL:** Grades 3 - 8

**TIME:** One or two class periods for each of the following activities

## MATERIALS

- ❑ *Good Morning U.S.A.* handout for each group (p. 73)
- ❑ *Tropical Key* worksheet (p. 74)
- paper, pencils and pens
- a large piece of butcher paper divided to make a class bar graph of all items used in the *Tropical Key* worksheet

## PROCEDURE

1. Tell the students they are going to read about a day in the life of a student in the United States.

2. Divide the class into groups of five or six.

3. Each group will need a recorder, a reporter, an encourager, a timer, and a grapher.

4. Each group obtains and reads their *Good Morning U.S.A.* sheet.

5. Each group uses its *Tropical Key* as the directions indicate and the recorder writes down its collected information.

6. Each group reporter shares his/her group's findings with the class.

7. The grapher puts the group's items on the class bar graph.

8. Debrief the activity by reading the completed graph and discussing the results.

   - Were they surprised to find so many ordinary things came from the rainforest?
   - What ones did they know ahead of time and which ones were a surprise?
   - Which items used would contribute to the destruction of the rainforest?

## SUGGESTED FOLLOW-UP ACTIVITIES

☞ Have the groups research how rubber is tapped, how chicle is collected, how coffee is grown, etc.

☞ Make a poster or collage of rainforest products.



© SPICE

Read the following *Good Morning U.S.A.* Use the *Tropical Key* and list all the rainforest related products your group has used in the past week. If a product was used more than once, note that. Share your list with the other groups. Your grapher will enter this information on the class graph.

# GOOD MORNING U.S.A.

As the day begins, you rise from your soft pillow stuffed with the fluff from **kapok** tree seeds. Your bed headboard has **lacquer** on it made from the resin of rainforest trees. The morning shower is made pleasant by a soap scented with **rosewood oil**. If you are a girl, you put on lipstick dyed red with **annatto**. From your **mahogany** wood dresser you get your clothes for the day. The wood is protected by wax from the **carnuba palm**. You put on your **rubber**-soled tennis shoes and go to breakfast. The morning **coffee** is sweetened by **sugar** from a tropical cane. Your granola has **coconuts**, **cashews** and **palm oil** in it. On top of it you slice a **banana**. This is washed down with your daily vitamin C, in the form of **orange** juice.

The school bus arrives on its large **rubber** tires. The morning passes quickly and you are soon eating a lunch of **corn** bread, **sweet potatoes** and **chicken**. Dessert is **vanilla tapioca** pudding with canned **pineapple**. After school you have a **chocolate** bar for a snack. Later you have a bubble **gum** blowing contest with a friend. Just before dinner you water your **philodendron** plant that decorates your living room.

The family goes out for **hamburgers** at dinner. You have a double charcoal broiled burger, with **tomato** and a **Coca Cola**. The evening T.V. news has a program about useful plants and animals that come from the rainforest. Some of the plants and animals mentioned are: three plants with the potential to treat AIDS; a liana with thorns tipped with anti-coagulent; curare, a heart surgery muscle relaxant; mejoral, a Peruvian plant aspirin; and several plants being explored in cancer research. Poison arrow frog toxin is being used to explore how muscles and nerves work, as well as for its possible use as a heart stimulant and anesthetic. A plant called barbasco has been used as a natural insecticide. You take an **aspirin** for the headache you get from watching TV and go to bed.

# TROPICAL KEY

NOTE: At present, many of these plants and animals are raised as crops. They have their origins in the tropical forest. If the tropical forest had been destroyed before their properties were discovered, humans would have been denied the benefit of their use, or in some cases, their misuse.

**annatto** - - - - - - - - a dye made from the pulp around the seeds of the annatto tree
**aspirin** - - - - - - - - - a tropical plant extract, relative of the willow
**banana** - - - - - - - - over 800 different types in cultivation
**carnuba** - - - - - - - - an oil rich palm
**cashew** - - - - - - - - tropical tree, nut grows on top of the fruit, the tree bark is medicinal
**chicken** - - - - - - - - domesticated from a rainforest bird
**chocolate** - - - - - - made from the seed of the cocoa tree
**Coca Cola** - - - - - - *coca* is the plant cocaine comes from- the first cokes had this ingredient, but not today; *cola* is a caffeine rich plant that is used for flavoring
**coconuts** - - - - - - nut bearing palm, likes salt, grows near coast
**coffee** - - - - - - - - - an understory berry bush
**corn** - - - - - - - - - - - came from Latin America
**gum** - - - - - - - - - - - made from the sap of the chicle tree
**hamburger** - - - - - rainforests are being cleared in Costa Rica and Brazil to raise cheap beef for American fast food restaurants
**kapok** - - - - - - - - - a large emergent layer tropical tree
**lacquer** - - - - - - - - wood seal made from tropical resins
**mahogany** - - - - - - an emergent layer hardwood tree
**orange** - - - - - - - - - originated in the tropics
**palm oil** - - - - - - - - product of an oil palm
**philodendron** - - - a vine that grows from the forest floor to the understory and sometimes in the canopy, used as a common house ornament in the U.S.
**pineapple** - - - - - - a bromeliad
**rosewood** - - - - - - a large emergent layer tropical tree
**rubber** - - - - - - - - - a member of the fig family, an understory tree
**sugar** - - - - - - - - - - large grass growing in sunny places like riverbanks
**sweet potatoes** - underground tropical tuber
**tapioca** - - - - - - - - made from manioc
**tomato** - - - - - - - - - tropical relative of deadly night shade


© SPICE

LESSON TEN

# RAINFOREST CHOICES NO. 2

> "When investors destroy tropical forests to get timber, diamonds, hydroelectric power, iron, and grazing land for beef, and when poor people move into the forest searching for land on which they can grow food, we must ask questions."
>
> *Catherine Caufield*
> In the Rainforest

## OBJECTIVES

- to become familiar with rainforest problems and their global impact
- to work cooperatively in a group
- to practice critical thinking

**GRADE LEVEL:** Grades 6 - 8

**TIME:** One or two class periods for each of the activities

## MATERIALS

- ❑ 6 different *Group Information Sheets* (pp. 78 - 83)
- paper, pencil, crayon, felt tip pens, chart paper
- books from the *Resource List* or others that relate to New World rainforest peoples

## PROCEDURE

1. Divide the class into 6 groups of 5 or 6 students.

2. Have each group choose a reader, a reporter, a recorder, an artist and a traveler/supply person.

3. Give each group its *Group Information Sheet*. Review with all the groups the instructions that appear on their sheets. Each group must become familiar with its information in about ten minutes, after which each group will send its traveler to bring back information from other groups that might be useful in making a decision. Each group should give its traveler specific ideas about what information it wants him or her to bring back. Using this information and the information on the

© SPICE

sheet the group must decide how to solve the problem posed on its sheet. Each group must present a report on its problem and the solution it will use. This should include the reasons the students feel their decision was the best based on the evidence they had. Each group must produce graphics (chart paper size), to go along with the report. At least one class period should be dedicated to production, the next to reporting.

4. Each group's reporter shares the group's report with the class.

5. Debrief the lesson first by discussing the various scenarios and the solutions the groups came up with, then by listing them on the chalkboard or chart paper. Suggested debriefing:

   - What are some of the things common to all six of these situations?
   - Do you think these problems are world problems or do they belong only to regions with rainforests? Why?
   - What aspects of these problems illustrate global interdependence?
   - What basic human values are questioned?
   - How do scarcity and demand influence what happens to rainforests?
   - What are some positive results of rainforest development and what are some negative consequences?
   - What kinds of things do individuals do that contribute to the rainforest devastation and the acceleration of the greenhouse effect?

6. Have each child in the class give a written response in his or her rainforest journal to the three types of questions posed in Handout no.

   **Personal:**

   How did you feel about doing this activity? Did you feel your group made the right decision? Why? Why not? Did you feel there was a right or wrong answer to the problem? How involved did you feel in your group's problem? Was it a problem you felt a rainforest person might think important? Why? Why not?

   **Interpersonal:**

   Who were the leaders of your group? How did that happen? What decisions were made, if any, by the leader(s)? Did everyone participate in the decisions, or only a few people? Why were the decisions made that way? Did you want more say in the decision-making? Did the decision-making process you used as an individual resemble in any way the process that might have been used by the other people in your group? How could your group function better in future problem-solving?



© SPICE

**Process:**

What did you learn about rainforest people from this problem-solving exercise? Are the lives of rainforest people simpler than ours, or complex in ways different from ours? Are non-indigenous rainforest people living in harmony with nature, exploiting the forest, or doing something in between? What human failings contribute to the rainforest problems? Are these problems unique to only one country? Are we contributing to the rainforest problem? What evidence do you have to back up your statements?

## SUGGESTED FOLLOW-UP ACTIVITIES

- ☞ Have the class look in the newspaper or magazines for articles relating to rainforest problems and share them with the class.
- ☞ Discuss some of the solutions being suggested, such as a "debt for nature swaps."
- ☞ Have the students produce a newscast presenting several points of view on a rainforest problem. Students can plan, write and videotape their product.

© SPICE

RAINFOREST CHOICES NO. 2

# GROUP ONE

## INSTRUCTIONS

- This problem is based on a true situation.
- You have ten minutes to learn the information on this sheet.
- Think about your group problem and give some directions to your traveler, so she or he can collect the information you need.
- The reporter exchanges ideas with the traveler in each group.
- Decide on a group solution to your problem.
- Write a group report about your problem and the solution you chose. Be sure to tell why this is the best solution based on the information you had.
- Draw a large illustration on chart paper to support the presentation of your report.
- You may use any of the books in the classroom for your report or illustration.
- Report to the class.

## GROUP PROBLEM

- Your group is a Japanese industry that makes panels for pouring concrete forms on construction projects. Your company has an opportunity to buy a large amount of Brazilian rainforest trees at a very cheap price. The sale, however, is in defiance of a new Brazilian law that prohibits the export of raw logs. Should you purchase these logs? Why? Why not?

## INFORMATION

- You are the largest importer of tropical hardwood.
- 70% of your country's timber has never been cut. Your government restricts its cutting. Foreign wood is much cheaper.
- Many of the forests of Southeast Asia and Africa have been stripped bare. They have been your source of wood since 1947.
- You are eager to utilize the Latin American rainforest, which represents 60% of the world's rainforest, but only 5% of the world timber trade.
- A director of the Latin American Forestry Institute in Venezuela says, "Uprooting trees worldwide will eventually have very, very strong consequences on the environment."
- The Brazilian Timber Industry assures your company that they can get a special permit for the sale, because the forest will have to be cleared anyway for hydroelectric dams. Everyone involved in the deal will make a profit.
- Your company stands to make a very large profit on the deal and your stockholders will be happy.
- 10% of your country's industrial waste comes from the product you plan to manufacture. Research could be done to find alternatives to these types of wood panels. Research could also help find ways to recycle your product.
- World Wildlife Fund objects to the purchase and contends that your country has abused the world's tropical forests in flagrantly wasteful ways and in the long run may upset the global ecological balance.
- Brazil says they will sell the logs to another buyer if the deal falls through. They claim the timber workers will lose their jobs if they don't sell logs.
- The other product you make is disposable wooden chopsticks.



© SPICE

RAINFOREST CHOICES NO. 2

# GROUP TWO

## INSTRUCTIONS

- This problem is based on a true situation.
- You have ten minutes to learn the information on this sheet.
- Think about your group problem and give some directions to your traveler, so he can collect the information you need.
- The reporter exchanges ideas with the traveler in each group.
- Decide on a group solution to your problem.
- Write a group report about your problem and the solution you chose. Be sure to tell why this is the best solution based on the information you had.
- Draw a large illustration on chart paper to support the presentation of your report.
- You may use any of the books in the classroom for your report or illustration.
- Report to the class.

## GROUP PROBLEM

- Your group is the Rainforest Worker's Union which harvests rainforest products in an ecologically sound manner. Your leader has received international recognition as an environmentalist bent on saving the tropical rainforest. A rancher in your region has repeatedly threatened the life of your leader and your fellow workers. The rancher wants you to stop your lobbying for rainforest reserves and get off the land he claims is his. Should you and your leader stop what the union is doing or continue and risk your lives? Why? Why not?

## INFORMATION

- Human rights activists claim that the large landowners of the rainforest kill with impunity.
- 52% of the land is owned by 2% of the population.
- The land issue constantly spawns violence. In your area alone in the last eight years, more than 500 people have been killed in murders linked to land disputes.
- A defense attorney in a rainforest city looked at the statistics and said, "Death has become an insignificant and common occurrence, like fruit falling from a tree."
- Your union represents the peasants and indigenous peoples that want to conserve the rainforests. It will be difficult for them to find another champion with the stature of your union leader.
- The conservative rubber tapping policy your union practices helps the trees recover and live on, but it has to remain a forest forever. Ranchers want to cut it down so they can graze cattle and make money selling inexpensive beef to U.S. fast food chains.
- The Government appears to be on the side of the large land holders, as they left land reform out of the new Constitution.
- Your union leader was honored at the United Nations for conservation efforts.
- The Government has sent two bodyguards to protect your leader from the threatening rancher and others.

© SPICE

RAINFOREST CHOICES NO. 2

# GROUP THREE

## INSTRUCTIONS

- This problem is based on a true situation.
- You have ten minutes to learn the information on this sheet.
- Think about your group problem and give some directions to your **traveler,** so he can collect the information you need.
- The **reporter** exchanges ideas with the **traveler** in each group.
- Decide on a group solution to your problem.
- Write a group report about your problem and the solution you chose. Be sure to tell why this is the best solution based on the information you had.
- Draw a large illustration on chart paper to support the presentation of your report.
- You may use any of the books in the classroom for your report or illustration.
- Report to the class.

## GROUP PROBLEM

- The members of your group are sons of powerful rainforest ranchers. You have grown up listening to your father talk about your inherited right to the part of the rainforest that the Rainforest Workers Union has set aside as a rainforest extractive reserve. Your father has often talked about removing the Union's leader by killing him. You are tired of the violence, the fear, and the animosity you have to face every day from your workers and the townspeople. You don't want the killing to go on, but you also don't want to give up your right to the land. All of your friends and brothers side with your father. Should you try to prevent your father from carrying out his threat against the union leader? Why? Why not?

## INFORMATION

- As in many other countries, your father's word is law in your family.
- Your land has allowed you to lead a very privileged life, while the people around you are near starvation. You don't feel good about this, but you feel that there is nothing you can do about it.
- The lack of law enforcement on the frontier breeds violence. It seems that everyone carries guns. It makes you wary of people who are not your friends or family.
- The peasant and union movements are growing in strength and numbers. The language of the spokespeople often makes you appear as the enemy.
- The Rural Democratic Union (UDR) to which your family belongs, has stockpiled over 70,000 weapons to defend large landholdings and cattle ranchers against attempts by the peasants to implement existing land reform laws.
- Amnesty International and the church of which your family is a member, claims UDR is responsible for the deaths, disappearance and torture of hundreds of indigenous people, peasants, priests and union leaders.
- The priest from your church tells you that it is wrong to do harm to others.
- The union leader threatened by your father is world respected for his efforts on behalf of the rainforest environment. The union leader represents 150,000 people through the Rainforest Worker's Union. His murder may bring world outrage upon your country and family.



© SPICE

RAINFOREST CHOICES NO. 2

# GROUP FOUR

## INSTRUCTIONS

- This problem is based on a true situation.
- You have ten minutes to learn the information on this card.
- Think about your group problem and give some directions to your traveler, so he can collect the information you need.
- The reporter exchanges ideas with the traveler in each group.
- Decide on a group solution to your problem.
- Write a group report about your problem and the solution you chose. Be sure to tell why this is the best solution based on the information you had.
- Draw a large illustration on chart paper to support the presentation of your report.
- You may use any of the books in the classroom for your report or illustration.
- Report to the class.

## GROUP PROBLEM

- Members of your group are high ranking officials in the church. Your group is an advocate for the landless poor. Regardless of the fact that your group is internationally famous for its work with the poor, many threats and attempts have been made on the lives of your members. Should you continue your work or concern yourself only with religious doctrine? Why? Why not?

## INFORMATION

- As part of the Church's Pastoral Commission on Land (CPC) your group keeps a count on a computer in Goias. It records daily those people who have received threats, been attacked or have been killed.
- One member of your group barely escaped a savage attack in June, 1988.
- The Church is a good platform for talking about land reform, since most people in the country, rich or poor, belong to your church. To be effective you must be able to speak out.
- Your group led a vigorous campaign for land reform, but the new constitution did not include it.
- The Movement for Rural Landless Workers claim that 1,200 rural workers were killed by gunmen between 1982 and 1985 and not a single landowner stood trial.
- Some conservative members of your church do not support your group's action. Others see you as a hero to the poor.
- If your group did not work for the poor, who would?
- You all believe you are doing God's work and that your rewards will come in heaven.
- Your group is internationally recognized as working toward bettering the situation of the poor. Would this recognition continue if you bowed to pressure?

© SPICE

RAINFOREST CHOICES NO. 2

# GROUP FIVE

## INSTRUCTIONS

- This problem is based on a true situation.
- You have ten minutes to learn the information on this sheet.
- Think about your group problem and give some directions to your traveler, so he can collect the information you need.
- The reporter exchanges ideas with the traveler in each group.
- Decide on a group solution to your problem.
- Write a group report about your problem and the solution you chose. Be sure to tell why this is the best solution based on the information you had.
- Draw a large illustration on chart paper to support the presentation of your report.
- You may use any of the books in the classroom for your report or illustration.
- Report to the class.

## GROUP PROBLEM

- Your group is the World Bank. You lent the money for the road to be built in the rainforest. The recipients of your loan have been required to set up preserves sheltering the rainforest and the Indians living in it. The large number of new settlers coming down the road has caused many violations of this requirement. Settlers and indigenous people clash frequently and the deforestation continues at an alarming rate. Should you call for immediate repayment of the loan, attempt law enforcement by your group, cut off all future loans to this country, or sell off their debt to an environmental group? Why? Why not? Are there other options ?

## INFORMATION

- The towns have become lawless frontiers similar to our "wild west" of the 1800's and are beyond government control.
- You have an ally in the 150,000 member of the National Council of Rubber Tappers.
- This country contains 30% of the world's remaining tropical forests. It is essential to save them.
- Environmental protection cannot be separated from social justice for the people. The poor need to live decent lives. Everyone needs to eat and be housed.
- Banks are usually not concerned with conservation. It is not usually profitable.
- Wild inflation has made it difficult for this country to pay its debt. It has paid interest only on the loan this year, but the whole situation could suddenly go into total default. Your investors could lose everything.
- Farming rainforest soils has proved disastrous. The soil is not fertile and the small farmer has to cut down more and more forest to stay alive.
- This country wants to build more roads. Will they be a good risk?
- The various members of the World Bank are unsure just how to proceed. This is not the only country that is defaulting on their loans. Non-payment is causing great financial stress for the members of your banking organization that financed the loans.
- You cannot legally interfere in a country's internal affairs.
- You have been blamed for the devastation of the rainforest and you are unhappy about this. You wonder if a bank should be concerned with long range consequences.
- Some conservation groups are willing to buy up loans in exchange for rainforest preserves.


© SPICE

RAINFOREST CHOICES NO. 2

# GROUP SIX

## INSTRUCTIONS

- This problem is based on a true situation.
- You have ten minutes to learn the information on this card.
- Think about your group problem and give some directions to your traveler, so he can collect the information you need.
- The reporter exchanges ideas with the traveler in each group.
- Decide on a group solution to your problem.
- Write a group report about your problem and the solution you chose. Be sure to tell why this is the best solution based on the information you had.
- Draw a large illustration on chart paper to support the presentation of your report.
- You may use any of the books in the classroom for your report or illustration.
- Report to the class.

## GROUP PROBLEM

- You are a group of settlers. You have come down the road to the rainforest. You have not found a job, so your group hitches a ride with a passing truck and drive along in hopes of finding the dream farm that will make you rich. You become squatters on an ecological reserve near this road. Representatives from the government have just arrived and have an order to evict you. Should you move on, go back to where you came from, or resist the agency and the indigenous people and fight? Why? Why not?

## INFORMATION

- You think the Indians are lazy. They have so much land they are not using, while you are hard-working and have so little land. Can this be fair?
- The insects are terrible and many people have contracted malaria from the mosquitos.
- The nearest town is a horror of lawlessness, greed, drunkenness and disease. The government seems to be unable or unwilling to control these excesses.
- You have no money to buy fertilizer to keep the land fertile when the rains leach away the top soil in two years.
- You have no trade and no education so you will starve if you go back to the city.
- You hope that the future will be better if you can just hang on.
- The land barons periodically send out thugs to kill people like yourselves, so they can seize your land. No one seems to prosecute them.
- Others have organized raids against the indigenous people and killed them for their lands. Whole villages have been wiped out.
- The indigenous people are dying off from diseases like the common cold. In 1950, 35,000 Indians lived in your area. There are now only 5,000.
- The indigenous people have been known to kill farmers.
- The government often turns its back if there is resistance to their orders. They often make a show of complying with the law, then back off.

© SPICE

LESSON ELEVEN

# WHAT HAVE YOU GOT TO LOSE?

"For in the final analysis, our most basic common link is that we all inhabit this small planet. We all breath the same air. We all cherish our children's future. And we are all mortal."

*John F. Kennedy*

## OBJECTIVES

- to demonstrate what students have learned about rainforests
- to practice critical thinking skills
- to understand cause and effect
- to participate in the self-evaluation of their learning, within a game format

**TIME:** One class period

## MATERIALS

Each group will need:

- ❑ a set of *Interdependence Cards* (p. 87)
- ❑ a set of *Environmental Win Cards* (p. 92)
- ❑ a set of *You Lose Cards* (p. 94)
- scissors, glue, index cards, and large colored or plain paper
- one die

## PROCEDURE

1. Tell the class that they are going to play a game that requires them to use the information they have been gathering in the past weeks. Each child will build his or her own protected New World Rainforest.

2. Divide the class into six groups of 5 students each. Each group should choose an encourager, a consultant, a timer, a card dealer and a supply person. Explain to the class that a consultant should be someone who knows the material well and can make helpful suggestions about how to build your protected forest.

© SPICE

3. Give each group the three sets of game cards. Have each group cut and glue their own cards. Color code the cards so each deck is a different color. The card-making by the students will serve as a review of unit material.

4. When this is completed, give the rules to the whole class.

## RULES

- The card dealer places the cards in the center. There will be three stacks. *Environmental Win Cards, Interdependence Cards* and *You Lose Cards.* Each player is dealt two cards from any stack to start with, then lay them face up in front of her/him. This is the start of their forest.
- Take turns rolling the die.
- The numbers 1, 3 and 5 let you take one card from the *Interdependence Cards.* 4 and 6 let you take a card from the *Environmental Win Cards.* 2 gets you a card from the *You Lose Cards.*
- If you are dealt a *You Lose Card,* read it aloud, do what it says and return it to the bottom of the pile. You may use any *Environmental Win Card* that you have to keep a *You Lose Card* from being totally effective. If you use an *Environmental Win Card,* it is returned to the bottom of its deck. If you lose something, return the card representing that item to the bottom of the appropriate deck. All other cards are laid out in front of you to build your rainforest.
- Each group plays until all the *Interdependence Cards* are gone.
- There are no winners or losers in this game. Everyone will build a rainforest, but each will be a little different.

5. Paste cards onto colored or plain paper. Students may want to draw a rainforest backdrop for their cards. This will serve as a visual aid for for the debriefing activities.

## DEBRIEFING

- Each student will verbally share his/her rainforest with the class. The students' explanations should include: good things that happened, bad things that happened, how they felt when bad things happened to their forest, how they tried to protect their forest and what use their little forest is to the world.

- Each student will write about his/her forest in his/her rainforest journal.



© SPICE

# INTERDEPENDENCE CARDS

Please cut along the dotted lines and paste onto index cards of appropriate size.

| | |
|---|---|
| a palo santos tree | a long line of soldier ants |
| a strangler fig | a centipede |
| an orchid plant | an emerald boa |
| an amorphous butterfly | an eyelash viper |
| a yellow fungus | a flock of red macaws |
| 14 sunning turtles | a mahogany tree |
| 6 black-fronted capuchin monkeys | an acacia tree |
| oyster mushrooms | a dung beetle |

© SPICE

| | |
|---|---|
| a walking stick | 10 cocks of the rock |
| a cerus cactus | a cacao tree |
| coffee bush | a swarm of piranha |
| a giant anaconda | 3 tank bromeliads |
| a poison arrow frog | a tapir |
| a passion flower vine | a philodendron |
| a toucan | a whip scorpion |
| 5 hummingbirds | a swarm of malaria mosquitos |
| a rubber tree | a pile of decaying leaves |



© SPICE

| | |
|---|---|
| a grove of coffee bushes | cluster of yellow butterflies |
| termites | a rhinoceros beetle |
| emerald moss | 6 tree ferns |
| a kapok tree | 2 catfish |
| a wasp nest | an armadillo and baby |
| a cluster of tillandsia bromeliads | a jaguar |
| 2 anoles lizards | a band of howler monkeys |
| 12 peccaries | one ocelot |
| 2 white caymans | a sloth |

© SPICE

| | |
|---|---|
| a commune of spiders | a flock of orinoco geese |
| a family of Piro Indians | a Jesus Christ lizard |
| sandflies | a patch of underground fungi |
| 6 pineapple bromeliads | a banana patch |
| a cashew tree | corn patch |
| 6 nectar eating bats | a stand of bamboo |
| a long fisherman | a clump of oyster mushrooms |
| a coati mundi | 3 geckos |
| a troop of squirrel monkeys | bird eating spider |



© SPICE

| | |
|---|---|
| 4 palm trees | a termite nest |
| lichens | llanas |
| pond of giant waterlilies | aerial roots |
| bush full of hoatzin birds | manioc patch |
| a clump of wild pineapples | 13 human beings |
| a flock of ant birds | a swarm of leaf cutter ants |
| 8 woodstorks | a black cayman |
| a family of giant river otters | a log full of grubs |
| 2 capybaras | a group of old hardwood trees |

© SPICE

# ENVIRONMENTAL WIN CARDS

Please cut along the dotted lines and paste onto index cards of appropriate size.

| | |
|---|---|
| **Your forest is made a restricted reserve.** | **Your forest becomes an extraction reserve.** |
| **The government passed a law protecting the trees from being cut.** | **White caimans become a protected species.** |
| **Fire ants miss your camp.** | **A rare butterfly is found in your forest.** |
| **Poachers are caught and arrested.** | **The U.S. gives money to preserve your forest.** |
| **You discover a family of birds thought to be extinct.** | **Scientists set up a camp to study the flora and fauna of your forest.** |
| **You see black Humbold wooley monkeys.** | **Natives plant fruit trees on their old corn patch.** |
| **Northern hemisphere birds migrate to your forest annually.** | **Equador replants part of its burned rainforest.** |
| **Mahogany trees can't be cut in your forest.** | **You get beneficial rains.** |





© SPICE

| | |
|---|---|
| Monkeys are eating figs and fruit; some of the fruit drops to the forest floor. | Underground fungi break up rotting leaves. |
| There is a sudden increase in the jaguar population. | An anaconda swims away from your canoe. |
| A Japanese timber deal is refused. | A cattle baron is refused the right to burn forest. |
| Howler monkeys wake you up. | A mining company stops dumping in your river. |
| The world wildlife fund stops the sale of your forest. | The government of Brazil stops the burning of their forest. |
| The killers of a "save the forest" advocate are jailed. | Brazil develops good land reform laws. |
| Scientists develop a cancer cure from one of your orchids. | Developers can no longer buy forest land. |
| | |
| | |

© SPICE

# YOU LOSE CARDS

Please cut along the dotted lines and paste onto index cards of appropriate size.

| | |
|---|---|
| **Cattle barons burn your extract reserve. Lose your rubber trees or hardwoods.** | **Poachers kill your caymans to sell for wallets. Lose your caymans.** |
| **So much rainforest is burned that the climate changes. Lose your rain or tall trees.** | **Plant sellers strip your trees of their orchids. Lose your orchids.** |
| **Erosion starts where you have burned your land. Lose one animal card.** | **Miners dump mercury in your river. Lose your fish.** |
| **The common cold kills your tribe. Lose your people.** | **A bird eats your centipede. Lose one centipede.** |
| **Your tank bromeliad dries up. Lose one poison arrow frog.** | **A strangler fig gets large enough to kill your tree. Lose an emergent layer tree.** |
| **People cut down your palms to eat the hearts. Lose all your palms.** | **You are killed by land barons. Lose your forest.** |
| **Your only jaguar is shot for fun by a tourist hunter. Lose your jaguar.** | **Drought causes your understory to die. Lose all understory plant cards.** |
| **A swarm of leaf cutter ants attacks your tree. Lose one tree.** | **A bird eats your amorphous butterfly. Lose one bird.** |



© SPICE

| | |
|---|---|
| An airplane sprays DDT to kill mosquitos. Lose your birds. | A Japanese company clears 70,000 acres of hardwood in the forest. Lose your forest. |
| The forest is burned for farming. Lose one card from each level of the forest. | Animal trappers net your monkeys and sell them to a zoo. Lose your monkeys. |
| An eyelash viper strikes your coati mundi. Lose your coati. | A U.S. fast food chain orders hundreds of cattle from Costa Rica. Lose your forest. |
| | |
| | |
| | |
| | |
| | |
| | |

© SPICE

LESSON TWELVE

# WILL THIS BE THE END?: A GAME OF JEOPARDY

"Once you have learned how to ask questions relevant and appropriate and substantial questions, you have learned how to learn and no one can keep you from learning whatever you want or need to know."

*Neil Postman & Charles Weingartner*
Teaching as a Subversive Activity

## OBJECTIVES

- to use questions and answers to demonstrate the students' acquired knowledge of the rainforest and its problems
- to use group support to review a body of knowledge

**TIME:** Two class periods

**GRADE LEVEL:** Grades 6 - 8

## MATERIALS

Each group will need:

❑ *Question* (p. 99) and *Answer* (p. 100) sheets
- a bottle of glue
- a pair of scissors
- a sheet of green paper for plant and animal questions and answers
- a sheet of red paper for general rainforest item questions and answers

## Activity no. 1: Study Time

## PROCEDURE

1. The teacher tells the students that they are going to play a game of jeopardy and that the teams need to study for the game.

2. Divide the children into groups of 5. Each group should select a reader, a cutter, a paster, a categorizer and a checker.

© SPICE

3. Each group matches the questions to the answers and tentatively arranges the questions and answers on the category papers, red for general rainforest items, green for plants and animals of the rainforest.

4. The group checker looks to see if the questions and answers are matched correctly and are in the correct category. When the group agrees with him or her, the checker asks the teacher to correct mistakes if there are any.

5. The paster pastes the questions and answers.

6. The team then uses these sheets to practice for tomorrow's game.

## Activity no. 2: A Game of Jeopardy

### PROCEDURE

1. The groups assemble, choose a score keeper and decide the order in which people in the group will answer. The student who answers first chooses a number, sight unseen, from the teacher's hand.

2. The group that answers question #1 responds first and the order is then established.

3. The teacher acts as the Master of Ceremonies. He/she asks the responder to choose a category and then reads an answer. The student tells what the question is. The next group then has a turn.

4. Each group keeps its own score of correct answers.

5. Teams congratulate each other on their scores.



© SPICE

# QUESTIONS

1. What part of the rainforest has the most plants and animals?
2. What grows in the understory?
3. Describe the forest floor.
4. What layer of the rainforest has the tallest trees and the most sunlight?
5. How much of the earth is covered in rainforest?
6. Approximately what percent of the earth's plants and animals live in the rainforest?
7. Where are New World tropical rainforests found?
8. Name a plant that both kills and gives life.
9. What is an interdependent system?
10. What characteristics of poisonous lizards, frogs and insects can be used to identify them?
11. What is the job of fungi and mushrooms in the rainforest?
12. What are three things to consider when deciding to plant manioc or corn?
13. What materials can be used to make arrows?
14. Name an explorer of the rainforest.
15. Name some sources of calcium in a rainforest diet.
16. What are some rainforest products?
17. Who owns most of the land in Brazil?
18. Where does much of the beef for U.S. fast food come from?
19. Who loaned Brazil the money to build the road that opened up the Amazon?
20. Name a country that wants to cut and buy timber from New World rainforests.
21. What is an extractive reserve?
22. What is a poacher?
23. What lays its eggs in tank bromeliads?
24. What is one of the most important things in the rainforest?
25. What do amorphous butterflies use to protect themselves?
26. Name three things on the forest floor.
27. What is the name for flesh-eating fish?
28. What is the greenhouse effect?
29. What is the average rainfall in a tropical rainforest?
30. What does the mantle of the rainforest do?

© SPICE

# ANSWERS

1. The canopy.
2. Short trees, vines and shrubs.
3. Humid, still, dark.
4. Emergent layer.
5. 7%
6. Half of all the plants and animals in the world live in the rainforest.
7. Central and South America.
8. Strangler Fig (Matapalo).
9. Plants and animals that need each other to survive.
10. Their bright colors.
11. To recycle nutrients to the plants.
12. Damage to the forest, rate of growth, to weed or not to weed.
13. Hardwood, monkey bones, stingray spines, bamboo, hard palm wood.
14. Alexander Von Humbolt, Aime Bonpland, Charles Darwin.
15. Insect shells, iguana eggs, turtle eggs, trout relatives, tiny fish.
16. Chocolate, lacquer, wood, rubber, nuts, coffee, chewing gum.
17. 2% of the population.
18. Rainforest land burned so cattle can graze.
19. The World Bank.
20. Japan.
21. A rainforest that remains intact but has its products harvested.
22. A person who kills protected animals.
23. Poison arrow frogs.
24. Fungi/mushrooms.
25. Camouflage.
26. Mushrooms, large animals, people.
27. Piranha.
28. A heating of the planet due to the trapping of long light rays in the atmosphere by a shield of carbon dioxide and other gases.
29. Sixty inches or more.
30. Absorbs water and recycles it back into the atmosphere.



© SPICE

LESSON THIRTEEN

# "WHO IS A SAVAGE? NOT I!" DEBRIEFING BIASED IDEAS, PHRASES AND WORDS

"The more you are right, the more natural that everyone else should be bullied into thinking likewise."

*George Orwell*
Selected Essays, 1968

## OBJECTIVES

- to examine some of the controversial quotes, words and ideas in this unit and from other sources
- to consider the historic perspective of given statements
- to examine some cultural practices that are different from ours
- to work cooperatively in a group
- to use critical thinking skills

**GRADE LEVEL:** Grades 6 - 8

**TIME:** One to two class periods

## MATERIALS

- ❑ *Statement Sheets* (pp. 105 - 109)
- paper and pencils
- video camera and video tape (optional)
- access to the reference section of the school library

## PROCEDURE

1. Discuss with the whole class how we as humans evaluate situations. Our perceptions are based on our experiences within our society. If this is true, how are other people evaluating the same situation? Will their perceptions and ideas be the same as ours? Why? Why not?

2. Tell the students that they are going to produce a television program called *Counterpoise*. They must be prepared to present their group's discussion on a statement following the guidelines provided under the section entitled "Issues."

3. When the students have prepared their debate, each group will present it to the class. If you have a video tape camera you may wish to tape the debate. They must be very careful to evaluate the statement for both positive and negative ideas.

4. Divide the class into five groups of six members. Each group will need to choose a moderator, a recorder, a timer/encourager/prompter and three panel members.

5. Give each group its *Statement Sheet*. The group as a whole should first discuss the central issue being addressed in the statement. If background research must be done, the group assigns the given tasks to its members. Each group should rehearse the debate before presenting it to the class (this will clarify and raise new questions). The format for the presentations as follows: The moderator presents the statement and poses the first question listed under "Moderator Questions." The three panel members take turns responding to the question regarding historical context, and then proceed to present their information on the statement. The moderator must use his/her judgement to interject the questions listed on the sheet (or others which may arise). The recorder documents the discussion, and the timer/encourager/prompter facilitates the discussion.

## SUGGESTED FOLLOW-UP ACTIVITIES

☞ Videotape *Counterpoise* and show to other classes or to parents at open house night.



© SPICE

STATEMENT SHEET

# GROUP ONE

**"What an extravagant country we are in! Fantastic plants, electric eels, armadillos, monkeys, parrots: and many, many, real, half-savage Indians."**

*Alexander Von Humbolt, 1799*
*German explorer*

## ISSUES

Be prepared to discuss these issues about the above statement:

- What century was this statement made in? What country does it refer to (remember the story you read entitled "A Man With a Curious Mind").
- Where was the person who made this statement from? What would this person have been doing in the South American rainforest?
- Try to imagine and then describe the differences in dress or appearance that existed between the German explorer and the indigenous people he encountered in the rainforest.
- How might these differences have been viewed by Alexander von Humbolt? Odd? Curious? Scary? Dangerous?
- How might have the appearance of the German (with so many clothes, strange tools or weapons, skin color, hairy face) been seen by the indigenous people? Odd? Curious? Scary? Dangerous?
- What would happen if this statement were made today?

## MODERATOR QUESTIONS

- What was the historical context in which this statement was made?
- What positive things are mentioned in this statement? What parts of the statement sound negative? Why?
- Do the negative elements in this statement reveal bias or ignorance on the part of the author? Why?
- If this were said about you ("half-savage ... ") how would you feel?
- Are people or situations which appear strange to us, scary?
- If a group of people does things differently from us is it bad or wrong?
- Summarize your position.

© SPICE

STATEMENT SHEET

# GROUP TWO

**"Beyond the Equator, everything is permitted."**
*Fifteenth-century Portuguese proverb*

## ISSUES

Be prepared to discuss these issues about the above statement:

- What is a proverb? What makes a proverb different from a statement by an individual?
- What geographic region does this statement refer to?
- What could the subject of the phrase "everything is permitted" be? Who is permitted to do everything?
- What was Portugal doing in the world in the 15th century (remember Bartolomeu Días and the Cape of Good Hope, Vasco de Gama, and Pedro Álvares Cabral in Brazil).
- What does this statement say about the way Europeans viewed the inhabitants of the New World? About the European role in the New World?

## MODERATOR QUESTIONS

- What was the historical context in which this statement was made?
- Who is the author of this statement?
- What positive things are mentioned in this statement? What parts of the statement sound negative? Why?
- Does this statement reveal bias or ignorance on the part of the speaker/s?
- If this were said about your country how would you feel?
- Do people today ever talk about other parts of the world in this way?
- Summarize your position.



© SPICE

STATEMENT SHEET

# GROUP THREE

**"When I consider the excessively small amount of labour required in this country, to convert the virgin forest into green meadows and fertile plantations, I almost long to come over with half-a-dozen friends, disposed to work, and enjoy the country, and show the inhabitants how soon an earthly paradise might be created."**

*A.R. Wallace 1853*
*British naturalist*
A Narrative of Travels on the Amazon and Rio Negro

## ISSUES

Be prepared to discuss these issues about the above statement:

- What geographic region does this statement refer to? What century was it made in? Where was the person who made the statement from?
- What does this statement say about how this European individual viewed farming practices in the tropical rainforest?
- What information was missing from Mr. Wallace's knowledge of this region?
- What kind of a paradise did the author envision for the New World?
- Who would be responsible for creating this paradise?
- What does this statement say about the way Europeans viewed the inhabitants of the New World?
- What does this statement say about how the Europeans viewed their role in the South American continent?

## MODERATOR QUESTIONS

- What was the historical context in which this statement was made?
- What positive things are mentioned in this statement? What parts of the statement sound negative? Why?
- Do the negative elements in the statement reveal bias or ignorance on the part of the author? Why? Why not?
- If this were said about you and your country how would you feel?
- Was the author correct in his views of the Amazonian rainforest and its people? Why? Why not?
- Were the Europeans able to create an "earthly paradise" in the New World? Why? Why not?
- Summarize your position.

© SPICE

STATEMENT SHEET

# GROUP FOUR

**"Our people use the rainforest our whole lives as a place where there are sacred sites, where there are materials to build houses, where you gather materials to make baskets, make bows and arrows, and everything we need. Indian people don't preserve the forest, they respect it, and live together with it."**

*Ailton Krenak (contemporary)*
*National Coordinator of Brazil's Union of Indigenous Nations*

## ISSUES

Be prepared to discuss these issues about the above statement:

- Where is the person who made this statement from and what century was it made in?
- In what ways do the people referred to in this statement depend on their forest for survival? What does the forest provide these people besides their basic survival needs?
- How does this person view the role of human beings in the rainforest?
- Describe this person's attitude towards the rainforest.
- How does this view of the rainforest differ from the views expressed in other statements you have heard here or elsewhere?
- What would this person, and others who share his view, think about clearing the rainforest for paper, cattle, or pineapple farms?

## MODERATOR QUESTIONS

- What was the historical context in which this statement was made?
- What positive things are mentioned in this statement? What parts of the statement sound negative? Why?
- Do the negative elements in the statement reveal bias or ignorance on the part of the author? Why? Why not?
- If Europeans had shared this view of the rainforest, how might the history of tropical rainforests been different?
- Think about where you live and your environment. How does your view of nature or the environment differ from the person who made this statement?
- If you depended on your immediate environment for survival (shelter, food, clothing) as well as spiritual sustenance, how would this affect your feelings about how the land should be used?
- Summarize your position.



© SPICE

STATEMENT SHEET

# GROUP FIVE

**"For the most part, little girls are obliged to participate in useful duties and responsibilities in the household long before their brothers are obliged to participate in useful domestic tasks... By the time the girls reach puberty they have already learned that their world is decidedly less attractive than their brothers."**

*Napoleon A. Chagnon*
*Anthropologist from the United States*
Yanomamo the Fierce People, 1976

## ISSUES

Be prepared to discuss these issues about the above statement:

- What part of the world is the author from? What would this person have been doing in the Amazonian rainforest?
- Would the life of a Yanomamo girl been familiar or unfamiliar to this person?
- In what ways does the life of a Yanomamo girl coincide with or differ from the life of girls in the United States?
- What adjectives or phrases are used to create an image of the Yanomamo girl's lifestyle?
- Judging from this statement, would you say that the author believes there are certain ways for girls to live that are good and others that are not so good? Explain.
- Would you describe the life of a Yanomamo girl, as presented in this statement, as happy or sad? Explain.

## MODERATOR QUESTIONS

- What was the historical context in which this statement was made?
- What positive things are mentioned in this statement? What parts of the statement sound negative? Why?
- Do the negative elements in the statement reveal bias or ignorance on the part of the author? Why? Why not?
- Do you think a Yanomamo girl would share the author's view of her life?
- If your lifestyle were described this way, how would you feel?
- Is it possible that there are positive aspects of a Yanomamo girl's life that the author has overlooked (based on what you have learned from previous lessons)? What could these be?
- Summarize your position.

© SPICE

LESSON FOURTEEN

# WHAT WILL HAPPEN IF I NEVER EAT ANOTHER HAMBURGER?

"Only by having our territory can we begin to talk about saving the Amazon. What environmentalists propose is to buy the furniture before building the house."

*Jose Uranavi*
General Secretary of COICA
(The Coordinating Body for the Indigenous Peoples' Organizations of the Amazon Basin)

## INTRODUCTION

Many attempts are being made to stop the ruin of the earth's rainforests. Many people and groups are concerned with the problems of the rainforest. Action is currently being taken by governments, international environmental groups, and local people. Whether the rainforests are cut or not cut, there are great economic problems related to these tracts of land and their productive use. Solutions that ignore this aspect of the problem only create new problems. An example of this is the practice of some conservation groups of carrying on "debt for nature swaps," exchanging payment of a portion of a country's debt to the World Bank in exchange for keeping a portion of their rainforest untouched. While this is a far-reaching idea that also considers some of the economics of the problem, it began as a conservation group dealing with a government. Consultation with the people already living in the forest in question was not considered. This is changing, however, as people from these countries become more experienced and indigenous people band together to demand the right to manage their own land. A protected reserve also means that the wealth of the forest goes untapped. This may be a very difficult stance to maintain in face of the growing number of people who have nothing but the land that remains today. Scientists are recognizing the value of some of the land management practices of the original natives. Indigenous peoples are helping them discover how to regenerate forest that was thought to be lost.

Innovative use of the rainforest is also being practiced. A Harvard University-based human rights group, *Cultural Survival*, funds projects supporting indigenous groups. It has backed ideas such as *Rainforest Crunch*, which uses nuts gathered by members of an Amazonian cooperative and marketed without a middle man, therefore increasing the cooperatives' profits.

The director of the *Cultural Survival* project says, "Romantic notions about the rainforest shouldn't become prisons for those who inhabit it." From their point of view, it is "use it or lose it." This solution is also not without its problems. Organizing cooperatives is difficult for people who are geographically isolated from one another, and these people have little experience with the managerial aspects of an international market.

With much cooperation and creative thought we may be able to both save *and* use the world's rainforests. The following lesson includes solutions tried at the international, national and local levels. It is intended to help students become more knowledgeable about problems and solutions concerning the rainforest and to stimulate critical thinking about the problem.

## OBJECTIVES

- to work cooperatively in a group (mind mapping/webbing)
- to think critically
- to examine cause and effect situations

**GRADE LEVEL:** Grades 5 - 8

**TIME:** Two class periods

## MATERIALS

- ❑ *Save the Rainforest Cards* (pp. 112 - 115) for each student, related to their chosen topic
- chart paper and felt tip pens for each group

## PROCEDURE

1. Divide the class into groups of 4 or 5.

2. Each group chooses a diagramer, a checker, an encourager and a reporter.

3. Each group chooses a Save the Rainforest Solution from the following list:

    - Boycott Rainforest Beef
    - Debt for Nature Swap
    - Ecotourism
    - Wild Harvest Sales Cooperative
    - Selective Logging
    - Restricted Wildlife-Biosphere Preserves





© SPICE

4. Discuss and illustrate for your class how to make a simple web, or mind map (see no. 7 below).

5. Give each person in the group a different *Save the Rainforest Card* related to the group's chosen topic.

6. Each person in the group shares his/her *Save the Rainforest Card* with the rest of the group.

7. When all the information is known, the group begins to make its diagram. The topic goes in a circle in the center of the diagram and successes and problems generated by this particular rainforest solution radiate out from the center. The students should be sure to record who took what action, why they took it and, if relevant, when it was taken.

8. In preparation for reporting its information the group should brainstorm for ideas to share with the class in order to encourage or discourage this particular rainforest solution.

9. The reporter shares the group's diagram with the rest of the class and gives the group's suggestions for action that may be taken by the students to support or prevent this particular rainforest solution. The merits and criticisms of the solution should be part of this discussion.

## SUGGESTED FOLLOW-UP ACTIVITIES

☞ Have students brainstorm about possible actions they might take to save the rainforest, individually and as a group (e.g., write letters to a government agency or your local representative stating their opinions about rainforest issues; write letters to heads of corporations involved with rainforest protection or destruction; write letters to the editor of the local newpaper about rainforest issues; raise funds for a rainforest action group).

☞ Create a class play about rainforest issues to share with the rest of the school and parents.

☞ Create a poster campaign aimed at promoting community awareness of the problem.

# Save the Rainforest Cards

## BOYCOTT BEEF NO. 1

If North Americans stop buying rainforest beef, farmers will no longer have to burn vast areas for cattle to graze. As it is, burning is not very economical because in three or four years the burned land with its poor soil must be abandoned. Nutrients in a rainforest are recycled from matter that falls to the forest floor. If the plants disappear, this cycle would stop. The very thin layer of topsoil is then washed away by the torrential rains.

## BOYCOTT BEEF NO. 2

The people who depend on the care of beef cattle for a living will lose their job. They have large families and have no way of leaving the region. There are few, if any, opportunities to get another job. They will find it very difficult to feed their families. North Americans will simply eat something else.

## BOYCOTT BEEF NO. 3

Large landholders that own the rainforest lands used to raise cattle have the money to explore other ways of exploiting the rainforest. They most often do not live on the cattle ranch and are not involved in what happens to their workers. They could explore other markets for cheap beef. The U.S. is not the only consumer of beef in the world, but it creates a large part of the market.

## BOYCOTT BEEF NO. 4

A fast food chain probably does not know the origin of its meat unless it has contracted with a specific rancher and met the shipment at the border. When beef is imported to the United States it is stamped with a U.S.D.A. quality mark. This happens at the border, and the buyer has no way of knowing whether the meat came from Central or South America, or the United States. Likewise, neither the consumer nor the butcher in the supermarket has any way of knowing the origins of the beef.

## BOYCOTT BEEF NO. 5

The United States Congress is considering a bill that would make it law for all imported beef to carry a stamp that tells where it was raised. If this bill passes, it would make the boycotting of rainforest beef much easier.

## DEBT FOR NATURE SWAP NO. 1

Countries that owe large amounts to the World Bank and are unable to make their payments can have a portion of their debt paid off by conservationists. In exchange, the government of the indebted country promises that a portion of its rainforest will be protected from the exploitation of trees, animals, and minerals. These land agreements are most often made without the consent of the indigenous peoples who live on them. Management of these territories is often difficult and inadequate.

## DEBT FOR NATURE SWAP NO. 2

Colombia recognized indigenous peoples' rights to half of the territory of the Colombian Amazon. Martin von Hilderbran, head of the government's Indigenous Affairs Department said, "Colombia believes that the Indians are the natural protectors of the Amazon ecology. It will be relatively easy for the Indians to patrol the area because the only access is by river." International financial support is needed to make this plan work.



© SPICE

## DEBT FOR NATURE SWAP NO. 3

One program encourages indigenous agricultural experts to return land burned over for cattle pasture to its original rainforest state. They are doing it without pesticides or fertilizers. Only a few miles away, non-indigenous farmers are cutting trees and burning undergrowth.

## DEPT FOR NATURE SWAP NO. 4

Some conservationists say as long as significant portions of society remain poor, the rainforest will never be saved. People will consume it in their desperate need to survive. Indigenous leaders insist, however, that people are just as much a part of nature as trees and butterflies and that their rights have been overlooked.

## DEBT FOR NATURE SWAP NO. 5

One indigenous tribe on the border of Peru and Brazil was murdered by a neighboring tribe with shotguns supplied to them by a Brazilian lumber company. The lumber company then moved in and cut the unprotected rainforest. Incidents such as this give strength to the argument that indigenous people cannot protect their own land. They also show that debt for nature swaps cannot be administered properly.

## ECOTOURISM NO. 1

Ecotourism is a way for the people who already live in a forest to preserve it while making a living for themselves. Ecological tourism includes birdwatching, hiking, sightseeing and visiting cultural sights. The director of the tourism agency for the state of Amazonia predicts that in the 1990's tourism will be the biggest source of income for his state.

## ECOTOURISM NO. 2

Successfully combining tourism and rainforest preservation depends on support from the local population. Priority for jobs, especially those of tour guide, must be given to the local people. Guides need to be trained in bringing tourists to the area without disturbing the environment. Ideally, tourists should leave nothing behind but their footprints and their money, and take nothing out but their photos.

## ECOTOURISM NO. 3

One rainforest has walkways suspended in the canopy so tourists can be in the area most abundant with life. Another rainforest has a tramway in the canopy for viewing plants and animals in the canopy habitat. The people of these reserves hope that tourism will help rather than destroy this delicate environment.

## ECOTOURISM NO. 4

In some places, ecotourism is harming the very environment it meant to protect. Growth in the ecotourism industry has been so fast that governments haven't been able to keep up with new protective laws. A wide path of litter marks the trails and waterways where tourists have been. Hastily built hotels with inadequate sewage systems have already polluted beaches on the Rio Negro.

## ECOTOURISM NO. 5

More money is needed to hire an adequate number of rangers to protect the reserves. Poachers and unlicensed guides help tourists kill animals and overfish the waterways. A crafty tour guide can earn a year's wages in one day, at the expense of the environment. The entire agency for the protection of the Brazilian Amazon has only 500 employees. The rangers themselves have to patrol areas larger than the country of Belgium.

© SPICE

**WILD HARVEST SALES COOPERATIVE NO. 1**

More than fifteen North American and European companies are looking into trying to extract natural rainforest products without destroying the environment. The idea is to prove that the forest is more valuable intact than burned over for cattle raising. The Amazon is a vast bank of plants, many of which lay undiscovered. They are an important source of high protein food and medicines.

**WILD HARVEST SALES COOPERATIVE NO. 2**

Nuts gathered from any given plot of land in the rainforest generate three to five times more money than the beef produced on the same piece of land. That doesn't include the cost of clearing the land, putting up fences or moving the pasture every five years. To include these expenses would increase the costs one hundred fod.

**WILD HARVEST SALES COOPERATIVE NO. 3**

The goal of the project is to help the people of the rainforest join together to market their product without having to deal with middlemen, who take away much of the profit. Things brought directly from the forest peoples net them three to five times their yearly income.

**WILD HARVEST SALES COOPERATIVE NO. 4**

Manioc, a plant widely grown for food in the forest regions, produces more calories per acre than any other crop in the world. We know it in the form of tapioca. The rest of the world eats it as a flour, or like a potato. This does not destroy the forest. Indigenous peoples have used manioc for centuries without destroying the forest.

**WILD HARVEST SALES COOPERATIVE NO. 5**

In Costa Rica, iguana lizards are being raised to take the place of beef. They yeild more meat per acre than cattle. They eat about 30% less food than chickens, yet produce the same amount of meat. It is said that iguanas are delicious and taste better than chicken. Their skins can also be used to make purses, sandals, watchbands and other small leather items. Raising iguanas will keep them from being hunted to extinction in the wild.

**SELECTIVE LOGGING NO. 1**

Selective logging is a process that allows the cutting of some, but not all of the trees in a given place. A lumber company contracts to cut a certain kind and number of trees in an area, leaving the rest to grow.

**SELECTIVE LOGGING NO. 2**

Valuable trees, such as mahogany, do not grow together in one place in the forest. They tend to be very far apart. This characteristic makes logging certain trees a very expensive operation.

**SELECTIVE LOGGING NO. 3**

In order to take valuable trees out of the heart of a rainforest, it is necessary to cut roads leading to the logging site. This causes destruction of the plants near and in the path of the road. It also opens the forest to poachers and others who can exploit the area.



© SPICE

**SELECTIVE LOGGING NO. 4**

When a large rainforest tree is cut, the many plants and animals that lived on the tree are destroyed. When it falls, its tremendous size knocks over many other trees and plants in its path. When this happens, a clearing is formed where many sun-loving plants can live off the rotting tree. If the tree is removed, so are the nutrients that feed these plants. This chain reaction leads to a damaged environment.

**SELECTIVE LOGGING NO. 5**

Ideally, young trees would be planted to replace the old. However, this is not a common practice in the rainforest. Lumber companies tend to go in, take what they want and ignore the consequences.

**SELECTIVE LOGGING NO. 6**

The chainsaw is the enemy of the rainforest. In Brazil, each new settler of the Amazon region is given a free chainsaw. The trees are therefore in danger of being cut down by settlers who see their easy access to the forest as a perfect opportunity to help them feed their families.

**RESTRICTED WILDLIFE-BIOSPHERE RESERVE NO. 1**

A restricted wildlife - biosphere reserve consists of three types of areas: a *core zone,* strictly preserved in its natural state, a *buffer zone,* set aside for controlled research and tourism, and a *cultural zone,* where indigenous peoples live in a controlled atmosphere in their traditional manner.

**RESTRICTED WILDLIFE-BIOSPHERE RESERVE NO. 2**

Outsiders are only allowed in the buffer zone. Only a limited number of people who have applied for a permit months in advance are let in. They must sign in when they enter the reserve and sign out before the time written on their permit. If the visitors are doing scientific study, their study must be approved by the administrators of the reserve before they can enter.

**RESTRICTED WILDLIFE-BIOSPHERE RESERVE NO. 3**

Native peoples living in the cultural zone must practice traditional ways of hunting, fishing and farming while preserving their way of life, language and ancient beliefs. These communities are valuable to mankind because of their ability to live in harmony with their environment. Their knowledge of natural medicine and other forest resources is also very valuable.



© SPICE

# RAINFOREST SLIDE SCRIPT

(Please note group tasks included at the end of this section)

1. Rainforests are the oldest, richest and most complex ecosystems on the planet. They are home to nearly half of the world's species though they cover less than 2% of the globe. Over a thousand forest tribes depend on the rainforest for their physical and cultural survival. Rainforests provide foods, medicines and other products that have improved our lives in countless ways. On a global scale, they help stabilize and preserve our climate so that we can continue to live on this planet.

2. The rainforest creates its own environment, including water, in the form of lakes and streams, as well as rain. A tropical rainforest acts like a giant sponge, catching moisture as it evaporates, and heavy rain as it falls in its canopy. This controls how fast water reaches the rivers and helps prevent erosion of the thin soils.

3. The highest part of the forest is called the emergent layer. The tallest trees are found here and birds abound. Emergent layer trees reach 150 to 200 feet tall - as high as a ten-story building. When you walk through the forest floor it is quiet, dark, and humid. If you were able to climb to the emergent layer, you would feel a blazing sun, dry heat like the desert, or the fury of a tropical storm.

4. Here you can see the tallest trees of the emergent layer and the canopy trees below them. The canopy is the layer where most of the plants and animals live. Can you think why? In the canopy, birds and animals find abundant food, as well as safety from large predators.

5. Does anyone know what this animal is called? What family of animals do you think it belongs to? This is a three-toed sloth, a very slow-moving mammal related not to monkeys, but to the anteater and armadillo. Some animals survive because they are fast, some because they are poisonous, and so on. The sloth's adaptive mechanism - how it survives - is its slowness. How could a sloth's slowness possibly help it survive? The sloth moves so slowly that predators cannot see it; so slowly that moths and beetles live in its fur, and algae grows on its coat, which makes it even more invisible in the green forest. Sloths spend most of their lives upside down in canopy trees. If forced to the ground, the tree sloth has to crawl on all fours because its limbs lack the strength to support its body.

6. This is a Strangler Fig, or matapalo tree, which starts as a kind of vine and ends up as tree. The matapalo grows down from the canopy and strangles the host tree, depriving it of nutrients and causing it to die slowly. The host tree starves to death. The matapalo then becomes a tree in its own right.

The matapalo tree is able to grow from the canopy down (instead of setting roots in the ground and growing up) because in the rainforest, nutrients are found up in the trees instead of in the soil. When you walk through the rainforest you get mud on your shirt instead of on your shoes!

7. Can you guess what this is? Though you may not believe it, mushrooms are one of the most important components of the rainforest ecology. The efficient, silent jaw of mushrooms and other fungi (pronounced 'fun-ji'), recycles old leaves, plants, dung and other decaying matter on the rainforest floor. Rainforest topsoil is thin and generally not very fertile. Without fungi, rain would wash away nutrient resources before they were broken down, and few trees in the rainforest would have the nutrients to survive. Rainforest mushrooms, like this canary-yellow one, can be very beautiful.

8. Do you notice anything strange about this tree? Look at the trunk. Do you think those are roots stretching out to the sides? Those are actually adaptations of the tree trunk - called "buttressing" - that allows tall trees to support their weight in shallow soil. It's like when you're standing upright and someone leans against you; it's easier to stay upright if you spread your feet apart than if you keep your feet together. When the early explorers arrived in the Amazon they thought that the dense foliage of the rainforest was a sign of incredibly rich soil. They were wrong.

9. When you cut down the rainforest, the soil can support only a few years of crops before it dries up, blows away, and turns into a desert. Without the trees and plants to hold the soils intact, heavy rains can wash the topsoil away and cause massive flooding, often leaving behind a barren wasteland that will eventually turn to desert.

10. The rainforest's greatest treasure is its biological diversity. Its stable climate, with continuing cycles of rain and evaporation undisturbed over history by periodic ice ages, has allowed a great variety of life forms to evolve. It is estimated that as many as 30 million species of plants, animals, and insects live in the rainforest. Among them are this transparent-winged butterfly.

11. There are colorful amphibians such as this poison arrow frog, used to poison the tips of arrows of indigenous peoples. This frog is actually as large as the fingernail of an adult's little finger. It is not poisonous to hold, but its bright colors advertise to predators that the miniscule frog is toxic to eat.

12. What do you think this is? This is a praying mantis, which has evolved a perfectly undetectable camouflage suit to protect itself against predators. Most of the organisms that exist in the rainforest (like this strange-looking creature) took millions of years to evolve, slowly adapting to a changing and highly complex environment. If the rainforest is removed, organisms such as this praying mantis cannot be re-created.


© SPICE

13. Can you think how birds might play a cooperative role in the rainforest? Birds spread the seeds of trees throughout the forest. How would they do this? They do this by eating the fruit, and then distributing the seeds in their droppings as they fly through the forest. Tropical birds - particularly parrots - are sold in large numbers in the U.S and Europe. Many of them - up to an estimated 300,000 a year - are smuggled illegally into the U.S.: in the hub caps of cars (you can imagine how they feel after that dizzying ride!), in pipes, pumpkins, and spare tires. The bird trade can also contribute to deforestation because parrots tend to nest high in the emergent layer, and the easiest way for the trapper to get to the bird is to cut down the entire tree.

14. Rainforest destruction effects not only innumerable plant and animal species, but human cultures as well. The forest peoples have long known the importance of harvesting plants and animals without damaging the balance of the rainforest ecosystem. The Kayapo people in the Brazilian Amazon (shown here) are master gardeners: they recognize and use more than 600 plant species for food and medicines.

15. Forest peoples know a great deal about how to use various types of plants to treat illness and disease. Much of what we know about such plants and their potential for curing disease was learned from these people. For example, of the more than 3,000 plants that the National Cancer Institute has identified as being able to fight cancer, 70% are found in the rainforests.

16. Many of the foods and spices that we use every day have their origins in the rainforest. Can you guess what these might be? This is a form of ginger. Other examples include bananas, peanuts, oranges, rice, corn, coffee, vanilla, cinnamon, and pepper.

17. Rainforests once covered an area twice the size of the United States - 4 billion acres. In recent decades, man has destroyed over half of the world's rainforests, and the rest are in serious danger. Tropical rainforests the size of Great Britain are being destroyed every year; rainforests the size of a football field every second. Millions of life forms risk being killed off, most of which we still know little or nothing about.

18. There are four major causes of rainforest destruction: logging, agriculture, cattle ranching and mineral extraction. In Latin America, the reasons for rainforest decimation are complex, and solutions are not easy. These countries owe a lot of money to international banks. In order to pay back their debt, the governments of these countries encourage cattle ranching and large-scale agriculture projects which grow crops like bananas, coffee and cotton for export.

© SPICE

19. Cattle ranching and large-scale export agriculture tend to aggravate the unequal distribution of land and sometimes force small farmers off their land. Governments encourage these landless farmers to move to the undeveloped rainforest in order to fend off land reform movements. For many of these settlers, the only method available for clearing the land is to burn down the trees. Because rainforest soils cannot maintain crops for more than two years, the settlers must move further and further into the forest, burning and depleting the soil as they go.

20. What is wrong with this picture? Throughout Latin America, cattle ranching is one of the main causes of rainforest destruction, as well as farmer loss of land. After the rainforest soil has been depleted by farming, grasses can still be grown to feed cattle for several more years. After 5 to 7 years of intensive cattle ranching, however, the forest begins to turn into a desert and the depleted soils can no longer even grow grass.

21. When a rainforest is cut-down, burned or flooded, it is gone forever. We lose one of the earth's greatest treasures: a lush environment which supports a biological diversity found nowhere else on the planet, and the home to hundreds of thousands of people who have learned to live off the forests without abusing them. We would also lose the home of free-ranging animals like this black jaguar, which might someday be found only in zoos, behind bars.

22. But there are ways of using the resources of the world's rainforests which allow it to continue to grow while providing the products we use in industrialized society. Here you see a rubber-tapper in Brazil extracting rubber from a living tree. In this way, he is able to make a decent living over the long-term without bringing harm to the forest.

23. And here, a local market displays a variety of rainforest produce. A recent study showed that earnings generated by harvesting edible fruits and nuts, rubber, oils and cocoa can be nearly two times greater than the return on timber or the value of land if used for grazing cattle.

24. If the destruction continues at the present rate of an estimated 100 acres a minute, all the earth's rainforests will be gone by the year 2040, within the span of a single human lifetime. That means before your grandchildren are born. Do you want this kind of a future for your children? The fate of the world's rainforests is in your hands.





© SPICE

# SEVEN GROUP TASKS

(To be used to help the students focus on the slides)

1. Find 3 things that live in the canopy layer, one thing that lives in the emergent layer, and one that lives on the forest floor.

2. Name one of the most important things in the rainforest. Why is it important?

3. Name a cooperative organism seen in these slides. How does it cooperate?

4. What are the main causes of rainforest destruction in Latin America?

5. Name some products that can be harvested in the rainforest without hurting the environment.

6. Who knows most about rainforest plants and animals? What do they know?

7. Note the exact time when the slide show begins and ends. Note how many acres of rainforest are destroyed per minute (information given in the slide show). Find out how many acres a football field covers. Calculate how many acres of rainforest were destroyed during the period that the slides were shown.

© SPICE

# RAINFOREST RESOURCE LIST

**CHILDREN'S BOOKS:**


Amadio, Nadine. *Alice in Rainforest Land*. Slawsons Communications Inc: San Marcos, California, 1988.

Baker, Jeannie. *Where the Forest Meets the Sea*. Greenwillow Books: New York, 1987.

Bates, Marston. *The Land and Wildlife of South America*. Life Nature Library, Time Inc.: New York, 1964.

Batten, Mary. *The Tropical Forest: Ants, Ants, Animals & Plants*. Thomas Y. Crowell Company: New York, 1973.

Cherry, Lynne. *The Great Kapok Tree*. Harcourt, Brace and Janovitch: New York, 1990.

Coppersmith, Sarah and Frederica Adelman. *Tropical Rainforests: A Disappearing Treasure*. Smithsonian Institution: Washington D.C., 1989.

Cowcher, Helen. *Rain Forest*. Farrar, Straus and Giroux: New York, 1988.

Dorros, Arthur. *Rainforest Secrets*. Scholastic: New York, 1990.

Earth Works Group. *50 Simple Things Kids Can Do To Save The Rainforest*. Andrews and McMeal, 1990.

Elbl, Martin and J. Terry Winik. *Tales From The Amazon*. Hayes Publishing Limited: Burlington, Canada, 1986.

George, Jean Craighead. *One Day in the Tropical Rainforest*. Thomas Crowell: New York, 1990.

Gibson, Barbara et. al. *Explore a Tropical Rain Forest*. National Geographic: Washington D.C., 1989. (pop-up book)

Peck, Robert. *Headhunters and Hummingbirds: An Expedition into Equador*. Walker and Co.: New York, 1987.

Perry, Donald R. *Journey Into a Hollow Tree*. Enslow Publishers: Hillside, New Jersey, 1980.

Podendorf, Illa. *A New True Book: Jungles*. Children's Press: Chicago, 1982.

Rohmer, Harriet et. al. *The Invisible Hunters.* Children's Book Press: San Francisco, 1987. (in English and Spanish)

------ and Jesus Rea Guerrero. *Atariba & Niguayona.* Children's Book Press: San Francisco, 1988. (in English and Spanish)

------ and Wilson Dorminster. *Mother Scorpion Country.* Children's Book Press: San Francisco, 1987 (in English and Spanish).

Scott, Lewis. *The Rainforest Book.* Living Planet Press: Los Angeles, 1990.

Troughton, Joanna. *How Night Came.* Bedrick/Blackie: New York, 1986.

-------. *How the Birds Changed Their Feathers.* Bedrick/ Blackie: New York, 1986.

Wood, John Norris. *Nature Hide & Seek Jungles.* Alfred A. Knopf: New York, 1987. (pop-up book)

**BOOKS:**

Botting, Douglas. *Humboldt and the Cosmos.* Harper & Row: New York, 1973.

Caufield, Catherine. *In the Rainforest.* University of Chicago Press: Chicago, 1984.

Denslow, Julie Sloan and Christine Padoch, eds. *People of the Tropical Rain Forest.* University of California Press: Berkeley, 1988.

Forsyth, Adrian and Ken Miyata. *Tropical Nature: Life and Death in the Rain Forests of Central and South America.* Charles Scribner's Sons: New York, 1984.

Goodman, Edward J. *The Explorers of South America.* Macmillan Company: New York, 1972.

Mee, Margaret. *In Search of the Flowers of the Amazon Forests.* Nonesuch Expeditions, Ltd: Suffolk, England, 1989.

Mitchell, Andrew W. *The Enchanted Canopy.* Macmillian Publishing Co.: New York, 1986.

Myers, Norman, ed. *GAIA: An Atlas of Planet Management.* Doubleday: New York, 1984.

Nichol, John. *The Mighty Rainforest*. Newton Abbot: London, 1990.

Perry, Donald. *Life Above The Jungle Floor*. Simon and Schuster: New York, 1986.

Schreider, Helen and Frank. *Exploring the Amazon*. National Geographic Society: Washington, D.C., 1970.

Silcock, Lisa, ed. *The Rainforests: A Celebration*. Chronical Books: San Francisco, 1990.

The Smithsonian Institution. *Tropical Rainforests: A Disappearing Treasure*. Booklet accompanying the travelling photographic exhibition, 1988.

**PERIODICALS:**

"The Painted People Rise." *Geo* 3 (April 1981).

"The Earth Diary, Brazil." *Geo* 3 (April 1981).

"Rain Forests: Nature's Dwindling Treasures," "Teeming Life in a Rain Forest," and "What Future for the Wayana Indians?" *National Geographic* 163 (January 1983).

"Rondonia: Brazil's Imperiled Rain Forest," and "Urueu-Wau-Wau Indians: Last Days of Eden." *National Geographic* 174 (December 1988).

"La Ruta Maya." *National Geographic* 176 (October 1989).

"Snatching Life From the Air." *National Wildlife* (June/July 1988).

Smithsonian Institution. "Going, Going, Gone? Tropical Rainforests: How They Work, What They Do for Us, What's Being Done to Them." *Art to Zoo* (October 1988).

"Rain Forests: Tropical Treasures." *Ranger Rick's Nature Scope* 4 (1989).

"Managing Planet Earth." *Scientific American* 261 (September 1989).

"Perscriptions from a Rainforest Pharmacy." *Smithsonian* 19 (February 1989).

"The Frogs Whose Perspiration Can Kill." *Smithsonian* 19 (January 1989).

"Planet of the Year: Endangered Earth," and "Biodiversity: The Death of Birth." *Time* 133 (2 January 1989).

"Torching the Amazon: Can the Rainforest be Saved?" *Time* 134 (18 September 1989).

"Doing Something About the Weather." *World Monitor* 1 (December 1988).

"Cooling It: The Global Warming Debate." *World Monitor* 3 (July 1990).

"A Rainforest Apparition." *Audubon* vol. 93, no. 1 (January 1991).

**MISCELLANEOUS:**

National Geographic Society Map: "Endangered Earth." (December, 1988).

National Geographic Educational Services Video: "Rain Forest." (55 min.)

Nature Recordings, Pacific Grove, California, Vol. V Tape: "Sounds of the Jungle and Tropical Rainforest."

Newsweek Map: "Issues Today: Global Environment, Danger Ahead." (Autumn 1989).

VanDam, Stephan. "The Rain Forest Unfolds, Eco Guide." Three-dimensional foldout. VanDam Inc.: New York, 1990.

Mitchell, Andrew. Oxford Scientific Films: "Wildlife of the Rainforest." Mallard Press: New York, 1989.

Rainforest Action Network and Amazonia Film Project. *Amazonia: Voices From the Rainforest. A Resources and Action Guide.* Rainforest Action Network: San Francisco.

Rainforest Action Network. Slide Show. Rainforest Action Network, 301 Broadway, Suite A, San Francisco, CA 94133 (415) 398-4404.



© SPICE

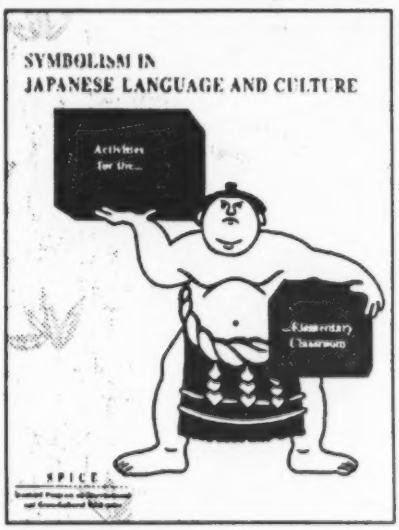
# SPICE

Stanford Program on International and Cross-Cultural Education

- Classroom-Ready Lesson Plans
- Reproducible Maps & Handouts
- Spiralbound Units
- Bibliographies and Appendices

The **Stanford Program on International and Cross-Cultural Education (SPICE)** represents a long-standing effort by Stanford University to improve international and cross-cultural education in elementary and secondary schools. Over the years, we have established a national reputation for publishing balanced, inclusive, academically rigorous instructional materials on complex issues. We have achieved this through our close cooperation with outstanding teachers and with faculty in areas of expertise at Stanford University. Our attention to international studies covers a wide range including Francophone Africa, Japan, Latin America, the Soviet Union and Eastern Europe, Western Europe, and China.

We believe firmly in the production of sound academic materials. At the same time, we feel that equal attention should be given to the teaching strategies used in the classroom. You will find that our materials contain engaging activity suggestions and are rich in content. Through the use of cooperative learning strategies, simulations, role plays, dramatizations, and other interdisciplinary and interactive critical thinking activities, we enhance the chances of success for all students. Teachers confronted with the diversity of today's classrooms will find that we provide many useful lesson plans and handouts on themes and content areas of critical importance.




Units can be used by economics, English/language arts, government, civics, US history and world history teachers in all grades, and we grant you permission to reproduce the handouts. Each one- to three-week unit is self-contained and provides teachers with the readings, black line masters, reproducible handouts, slides, and background materials necessary for instruction. Many one-day lessons can be used separately or together with the teacher's standard curriculum. Our free catalog describes SPICE's more than 60 units, ranging topically from cooperation in Japanese culture (elementary) to the geography of Latin America for (7-12, Spanish and English) and contemporary Soviet-American relations (9-12).

SPICE is part of the Institute for International Studies, and receives its funding from Stanford University, and several private foundations.

## This time, try SPICE . . .

☐ Yes, please send me a free SPICE catalog and put me on your mailing list.

NAME _____ (Please Print)

SCHOOL OR ORGANIZATION _____

ADDRESS _____

PHONE _____

CLASSES TAUGHT _____

INTERESTS _____

**Return to:**
SPICE
300 Lasuen Street
Littlefield Center, Room 14
Stanford University
Stanford, CA 94305-5013
Tel. (415) 723-1114